Internal Migration and Fiscal Structure

An Econometric Study of the Determinants of Interprovincial Migration in Canada

Stanley L. Winer, Denis Gauthier

A study prepared for the
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The Authors

Stanley L. Winer

Born in Toronto in 1947; studies in economics at Carleton University (B.A.) and The Johns Hopkins University (Ph.D.); former research economist for the Economic Council of Canada; currently associate professor at the School of Public Administration, Carleton University; author of several articles on the economics of federal States.

Denis Gauthier

Born in Montreal in 1955; studies in economics at the University of Montreal (B.Sc.) and Queen's University (M.A.); former research economist for the Centre for the Study of Inflation and Productivity, and the National Commission on Inflation; currently research economist for the Economic Council of Canada.

STANLEY L. WINER
DENIS GAUTHIER

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Table of Contents

Preface vii

1 **Why Study Fiscally Induced Migration?** 1
- An Introduction to the Issues 1
  - Migration and the Equity-Efficiency Trade-off 1
  - Another View of the Equity-Efficiency Trade-off 4
  - Migration and the Ownership of Natural Resource Rents 5
- The Need for and Role of Empirical Evidence on the Relationship between Internal Migration and Fiscal Structure 6
  - The Purpose of this Study in the Light of the Policy Debates 6
- Recent Trends in Interprovincial Migration and the Potential Role of Fiscal Structure 8

2 **"Interprovincial Migration and Economic Adjustment": A Preliminary Reconsideration with Emphasis on Unemployment Insurance** 13
- Introduction 13
- Re-estimating Courchene's Equations 13
  - A Selective Choice of Equations 13
  - The Dependent Variable and the Family Allowance Data Set 15
  - Estimation Results 16
- The Role of Unemployment Insurance in a Migration Equation 16
  - Extension of the Todaro/Laber/Chase Model of Income Expectations 16
  - Extension to Incorporate Unemployment Insurance 18
  - The Choice of an Index of Unemployment Insurance Generosity 19
  - A Revised Estimating Equation 22
  - Results of Using the Revised Equation 22
  - The 1971 Unemployment Insurance Legislation 23
- Differential Fiscal Structure Matters 24

3 **Differential Fiscal Structure in a Multinomial Logit Model** 25
- Important Problems in the Modelling of Fiscally Induced Migration 25
- The Multinomial Logit Model in a Migration Context 26
- Private Sector Explanatory Variables 27
- Public Sector Explanatory Variables 28
  - Why People Move in the Tiebout Class of Models: Scale, Mix, and Incidence Effects 28
  - Defining Net Fiscal Benefits 29

    The Treatment of Socio-economic Characteristics 31
    Comparison with Courchene-type Equations and the Role of Intergovernmental Grants 32
    The Role of Unemployment Insurance 33
    The Role of Natural Resource Revenues, Capitalization and Cost-of-Living Differentials 34
    Other Public Sector Variables 36
  The Tax Data and the Definition of Expected Income 36
    Constructing a Measure of Expected Employment Income Using Tax Data 37
  A Comment on International Migration 38

4 Estimation of Fiscally Induced Migration by Income Class 39
  Choice of Estimator 39
    A Note on Using Grouped Data 40
  Multicollinearity Problems and a Final Statement of Estimating Equations 41
  On the Possibility of Simultaneous Equation Bias 42
  Summary of Estimating Equations 42
  The Results: A Detailed Discussion 43
    Out-migration from the Atlantic Region 43
    Migration from the Rest of Canada to Alberta and British Columbia 47
    Equations with an Autoregressive Error Structure 50
    Migration from and to Ontario 50
    Migration from and to Manitoba and Saskatchewan and from and to Quebec 55
    Reasons for Differences in the Results across Regions 56
  A Summary of Tax Data Results Concerning Fiscally Induced Migration 60

5 The Quantitative Importance of Fiscal Structure 63
  Methodology 63
  Out-migration from the Atlantic Provinces 64
  Migration to Alberta and British Columbia 67
  A Comparison of the Relative Influence of Public and Private Economic Factors Affecting Interprovincial Migration 69

6 Summary and Concluding Remarks 71

A Definition of Variables Used in Estimating Equations and Sources of Data 75

B The Family Allowance Data Revision and Calculation of the Total Migration Series 79

C The Tax Data Migration Series 81

Notes 83

List of Tables and Figures 91

Bibliography 93

Preface

This work is concerned with the empirical relevance of the relationship between interprovincial migration and fiscal structure in Canada.

Fiscally induced internal migration lies at the centre of several policy debates. Two of these debates, which are of particular importance in the Canadian context, are surveyed briefly in the first chapter. Recent developments in Canadian interprovincial migration trends are also reviewed in Chapter 1, with a view to very roughly assessing the probability that fiscal structure had a part to play in them.

Prior to this study, there has been only one substantial piece of empirical work on fiscally induced migration in Canada, that by Thomas Courchene (1970). Chapter 2 presents a preliminary reconsideration of Courchene's statistical results using essentially his same estimating equations and a revised family allowance migration series. Also introduced at this time are certain variations on Courchene's equations as a prelude to the development of our own model of fiscally induced migration. The role of unemployment insurance in a migration equation is the focus of attention here.

In Chapter 3, we complete development of this new model in a modified multinomial logit framework. The most difficult problem addressed is how to make the best use of available aggregate data on fiscal structure in the context of a model of individual migration decisions. Our approach to this problem relies on the disaggregation by income class of a new migration series constructed from federal income tax files.

The completed model is estimated in Chapter 4 using the tax data, and a discussion of the estimates is presented. Some quantitative simulations and a brief statement of conclusions follow in the final two chapters.

A technical paper published separately from this study includes our revision of the family allowance migration data as well as the new migration series constructed from tax files. See Stanley L. Winer and Denis Gauthier, "Interprovincial Migration Data: A Supplement to *Internal Migration and Fiscal Structure*," Economic Council of Canada, Ottawa, 1982. This paper is available on request from the Economic Council of Canada, P.O. Box 527, Ottawa, K1P 5V6.

Several people have been particularly helpful in the course of this research, and we would like to acknowledge their assistance. David Sewell offered considerable encouragement throughout, and much constructive criticism on early drafts. Charles Walker was instrumental in providing the raw data for the family allowance series revision. Doug Norris, Nelson Kopustas, and Manohar Surkund supplied the programming that enabled us to assemble the tax data series at Statistics Canada. Other data were provided by Joel Dienna, Pierre Fortin, and Ken Norrie. Conversations with Jean-Michel Cousineau, Pierre Fortin, Marc Gaudry, and Tom Schweitzer were of particular help on other matters. We are indebted to three

anonymous reviewers for constructive criticism on both substance and style. Debbie Warwick typed the tables of estimates and several revisions of the text. Of course, the usual caveat applies.

1 Why Study Fiscally Induced Migration?

An Introduction to the Issues

The sensitivity of internal migration to interregional differences in fiscal structure is a central element in two particularly important economic policy debates in Canada. The first of these is concerned with the trade-off between interregional equity and the efficient allocation of factors of production across regions. Regional policy analysts have been debating the nature of this trade-off since the 1950s, along with the question of what policy should be adopted towards it. The second, and more recent, debate is concerned with the ownership of western natural resource rents. The discussion here centres on such questions as how resource-based tax revenues should be divided among federal and provincial governments, and whether provinces should be able to regulate interprovincial migration.

We begin this study of the fiscal determinants of interprovincial migration with a review of these debates. This review will illustrate the potential importance of fiscally induced migration to economic welfare, and therefore serves to motivate the econometric search for fiscally induced migrants that will be conducted in subsequent chapters. It will also prove to be of some help in choosing between alternative ways of representing fiscal structure in a migration equation, in selecting data samples, and in identifying empirical results that may be of particular policy relevance.

Migration and the Equity-Efficiency Trade-off

It is instructive to begin a review of the debate concerning the equity-efficiency trade-off by recalling that over 40 years ago the Rowell-Sirois Commission (Canada, Royal Commission on Dominion-Provincial Relations, 1940, Book II, p. 83) advocated as one basic principle of public finance in Canada that the federal government should transfer to the poorer provinces enough funds to enable those provinces to provide a national average standard of public services with taxation of average severity.

This call for what are now known as equalization payments was based on the Commission's desire to maintain "horizontal fiscal balance" in the federation; that is, to ensure that an individual of given economic circumstances would receive the same level of certain essential public services and incur the same tax burden wherever he lived in the country. In the absence of intergovernmental grants or some other corrective measure, this objective is not likely to be achieved in a federal system, as Buchanan (1950) has clearly shown. The essential problem is that, even if all governments treat individuals with equal incomes equally in fiscal terms within their own jurisdictions, the impact of all federal and provincial budgets combined will generally be such that individuals with equal incomes are treated unequally. To illustrate this point, if we consider two communities with an identical per capita output of publicly provided goods and services, the wealthier of the two communities will, *ceteris paribus*, be able to meet its revenue requirements with lower (income) tax rates. Raising a given amount of revenue per resident requires in general lower tax rates for higher levels of per capita income. As a result, for the specified amounts of local public services, an individual in the wealthier community will tend to have a smaller tax bill than an individual who has the same income but lives in the poorer jurisdiction.

Thus, from the standpoint of the fiscal system of the country as a whole, equals tend not to be treated equally. The Rowell-Sirois solution to this problem was for the federal government to transfer funds (or pay equalization) to the poorer provinces to equalize the fiscal capacity of all provinces. This would enable the poorer provinces to provide access to a national standard level of public services at interprovincially comparable tax rates if they so desired.[1]

The equalization program has become one of the social norms in Canadian society, so much so that it is to be entrenched in the new constitution.[2] In the view of some, however (notably Scott, 1952, and Courchene, 1970, 1978*a*, 1978*b*), it is not without cost that we do so. And here we turn to the role of migration, for the problem in this view is that equalization payments, to the extent that they do maintain horizontal balance or equity among Canadian citizens on the basis of province of residence, may produce through their impacts on provincial tax rates and public service levels, a more decentralized location of population than would be the case if the federal government did not attempt to equalize provincial fiscal capacities. This introduces economic inefficiency and hence reduces per capita incomes in the country as a whole, if it induces people to remain in or move to poorer areas of the country where their marginal productivity is less than it would be in the wealthier regions.[3]

The idea that equalization payments induce inefficiency in the regional allocation of resources first became prominent in Canada in the context of postwar debate over regional development strategies for the Atlantic provinces. It has been argued, perhaps most eloquently by Courchene, that equalization and "associated" transfer programs (about which more will be said later) are at least partly responsible for the fact that per capita earned incomes in the Atlantic provinces remain persistently below the national average. In Courchene's view, the persistently below average level of earned incomes in the Atlantic region strongly suggests that marginal productivities of some Atlantic residents are lower than they would be in the relatively richer provinces, and that out-migration to (say) Ontario would result in the equalization of productivities across regions, a reduction in regional disparities, and an increase in national per capita incomes. But, to continue, the market forces (as in Hicks, 1932) that would naturally tend to induce this migration from low-income to high-income regions and thus equalize earned incomes across the country are alleged to have been short-circuited by a fiscal structure that, via the equalization program, subsidizes residence in regionally depressed areas.

Courchene has forcefully extended this analysis to argue that at the centre of the regional development problem is the whole gamut of place-oriented, as opposed to people-oriented, government policies in Canada. Equalization is only one of several transfer programs that have as their focal point the provinces, as provinces, rather than as individuals within provincial boundaries. Together with formal equalization payments, programs such as regionally extended unemployment insurance and conditional grants that contain implicit equalization components may all serve to unduly impede the process of interregional adjustment by subsidizing the location decisions of individuals.[4]

Moreover, according to Courchene (1978*b*), political incentives embodied in the personal plus intergovernmental transfer system as a whole are such that the poorer provinces are encouraged to enact legislation that may be detrimental to the long-run growth of earned incomes in those provinces. This effect of the transfer system on provincial political behaviour, Courchene argues, contributes along with its direct effects on migration decisions to a situation in which certain provinces become ever more dependent on the transfer system, that is, become increasingly what can be called welfare dependencies. The problem is that the transfer system reduces the political cost of provincial legislation that tends to maintain regional disparities. For example, when the governments of the Atlantic provinces or Quebec raise their minimum wage levels, they do not bear the full political costs of the resulting additional unemployment among the unskilled or young. The reason is that the federal unemployment insurance system will support these people. Moreover, the fact that the unemployment insurance system after 1971 became relatively more generous in the poorer provinces increases the adverse political incentive there.[5]

As another example of the political repercussions of the pursuit of horizontal fiscal balance, consider the following. Whenever a provincial policy results in a fall in that province's tax base relative to its population, the equalization program will compensate by replacing the "own-tax" revenues of that province to some extent. Equalization is thus a kind of negative income tax for provinces. This means that all provinces receiving equalization payments may not be as careful as they otherwise would be in maintaining policies conducive to long-term growth of earned incomes, because these grants reduce the political cost of not doing so. Since only the poorest provinces receive equalization payments, the clear implication is that provincial policies that influence private activity are not likely to contribute to a narrowing of regional disparities over time.

It is probably fair to say that the analysis outlined above, which might aptly be labelled the "transfer dependency thesis," has become a major force in regional policy debates in Canada, and with good reason. It is a clear, consistent view based on standard neoclassical economic theory. However, part of this thesis, that dealing specifically with the undesirable effects of the equalization program on migration decisions, has been contested. Led by Graham (1963, 1964), several authors in Canada, including Boadway and Flatters (1981*a*, 1981*b*, 1982), have argued that equalization or an equivalent policy is required for the efficient allocation of factors of production across the country.[6]

In the Graham view, the fact that the wealthier provinces, because of above (national) average access to natural resource rents or to above-average per capita market incomes, could provide the same per capita level of public services at lower personal income tax rates in the absence of equalization payments (or better services at the same tax rates) means that people may have left the disadvantaged regions, even though their marginal productivity is highest there. They may have left because they care not just about their market incomes but also about their net fiscal benefit, which is equal to the value of public services received less what they pay in taxes. In other words, a fisherman from the Newfoundland outports may move to Toronto because he perceives that – for similar levels of taxation – he could obtain better schooling for his children in the latter location. His contribution to national output, however, may well be less in Toronto than in his native environment.

In general, a migration equilibrium of an individual will only occur when the sum of his market income plus his net fiscal benefit is equal across regions. Therefore, so long as interprovincial differences in net fiscal benefits exist, market incomes will not equalize across regions, and national per capita income will not, as a result, be as high as it otherwise could be. Since the problem is that migration choices are based partly on the difference in net fiscal benefits across regions, one solution is a system of equalization payments to eliminate these differences. Such a program would make fiscal structure an irrelevant factor in the migration decision of the individual. It would also, of course, ensure that horizontal fiscal balance is maintained. Thus, in the Graham view, we have here a rare instance where policies to promote efficiency and policies to promote equity do not imply an equity-efficiency trade-off. The same equalization program will serve both ends.

It is interesting to note that the above efficiency argument for equalization, which originally arose in Canada in the context of the debate over development strategies for the Atlantic region, can also be applied to the case of migration to the resource-rich provinces in the west (see, for example, Boadway and Flatters, 1981*a*, 1981*b*, or Wilson, Percy, and Norrie, 1980). Net migration to Alberta, which, as will be seen below, has accelerated dramatically since the price increases sought by the Organization of Petroleum Exporting Countries in 1973, is inefficient if it simply represents an attempt to capture natural resource rents via the Alberta fiscal system. For, in that case, migration is not related to the marginal productivity of the factors involved, and hence must result in economic inefficiency and a reduction in national per capita incomes. The obvious remedy for problems caused by the harvesting of resource rents by provincial governments is a program of equalization based on natural resource revenues, thereby making natural resource rents an irrelevant factor in the migration decisions of individuals. Hence, in this application, the Graham analysis suggests that at present there is too much migration to the west, since the present equalization formula does not fully reflect provincial natural resource revenues.

Graham's argument, while based in the same neoclassical theory of migration as that of Courchene, is confined solely to the (beneficial) effects on migration of the equalization program. On the other hand, Courchene is concerned with the broad range of government policies that can, he argues, interfere with interregional adjustment mechanisms, especially migration, that would otherwise tend to promote economic growth and equalize earned incomes across the country. Courchene could even concede that, on his terms, Graham is right about equalization when it is "properly" computed, and still argue that the essential problem is the place-oriented nature of other important transfer programs, such as the regional variations in unemployment insurance. Moreover, in view of his concern with the effect of the transfer system as a whole on provincial economic policy, Courchene might also argue that Graham has ignored the tendency of equalization to induce provincial policies with respect to private activity, which are inhospitable to long-term provincial growth. Or, in other words, Courchene could argue that Graham's view is not robust with respect to an alternative model of provincial government behaviour because, in this other (Courchene's) model, the efficiency-enhancing effects of equalization can be outweighed by the social costs of the provincial political behaviour engendered.

A quite different theory of regional underdevelopment, which is more fundamentally at odds with Courchene's analysis, and which would provide support for a wide range of regionally discriminating transfer programs, is Myrdal's (1957) cumulative causation hypothesis. To various degrees, this theory has been accepted in the regional development literature, a literature which has never fully accepted the neoclassical version of labour market adjustment. (See, for example, Holland, 1976, or Armstrong and Taylor, 1978.)

In Myrdal's theory, migration from the Atlantic provinces in response to (say) a fundamental shift in the centre of economic activity from the east coast to the centre of the country is selective, draining the east coast of its highly trained manpower and inducing unfavourable changes in the age structure of the remaining population. Such migration, in Myrdal's view, precipitates a long, downward cumulative process in the economies of the eastern provinces, as part of which, for example, tax bases in the east narrow, subsequently forcing provincial tax rates to be raised there to compensate, which then precipitates further out-migration, and so on.

The important points here are that migration does not serve as an equilibrating mechanism as in the neoclassical model of labour market adjustment, and hence that government intervention is required to eliminate persistent regional disparities. The brief sketch of the role of the public sector in the Myrdal process given above indicates how this process might be retarded or even reversed by any personal or intergovernmental transfer program that permits governments in declining regions to keep tax rates from rising.

Another View of the Equity-Efficiency Trade-off

Recently, Boadway and Flatters (1982) have offered another view of the equity-efficiency trade-off inherent in equity and efficiency considerations concerning provincially owned natural resource revenues.

In the Boadway/Flatters analysis, as in Graham's, efficiency requires that all differences across provinces in net fiscal benefits based on provincially controlled natural resource revenues be eliminated. Economic efficiency requires that factors of production be guided between activities (including those in different provinces when this is an option) by signals related to their productivity in these different locations. Differences in resource-fueled net fiscal benefits between provinces tend to distort the market signals that would be expected in many cases to do this job. The only solution is to eliminate the source of the problem, that is, the differences in net fiscal benefits from provincial government activities. Thus, in their view, economic efficiency calls for full equalization of interprovincial differences in net fiscal benefits from provincial government activities in the resource sector.

However, their analysis of what is required for equity in this situation differs from that of Graham. They conclude, as does Graham, that the form of the equalization program called for will (fortuitously) be the same, whether we are concerned with equity or efficiency. However, when provincial ownership of resources is accepted, the amount of equalization required to maintain horizontal equity is, according to Boadway and Flatters, less than that required to ensure efficiency.

The argument is as follows. Horizontal equity in the federal tax system requires that Canadians in similar personal financial circumstances but living in different parts of the country be in a position to enjoy reasonably similar living standards.[7] But, if there are interprovincial differences in per capita resource-based tax revenues, there will in general be corresponding differences in net fiscal benefits derived from residing in different provinces; the wealthier provinces will be able to provide the same per capita level of public services with lower average tax rates on personal market incomes. The federal tax transfer system, based solely on personal market incomes, will not be able to achieve horizontal equity in the federal tax system, because persons with identical comprehensive income (including resource-fueled provincial fiscal benefits) will be treated differently under such a tax system. It is then necessary to have in place an additional mechanism (like the equalization program) that is capable of reducing differences in the level of goods and services that provincial governments can provide to their citizens at some comparable level of costs.

So far, this is essentially equivalent to the Graham analysis, but Boadway and Flatters note that there are in fact two distinct approaches that could be taken to solve this equity problem, each one depending on a different view of horizontal equity. They call these the "broad-based" and "narrow-based" views of equity.

The broad-based view calls for the institution of a nationwide fiscal system that is horizontally equitable in terms of the actions of all governments, federal and provincial. According to this view, two persons who are equally well-off before provincial government actions must be made so afterward. To institute a federal tax system that ensures horizontal equity in this sense, the federal government must take account of the nationwide horizontal inequities introduced by the independent behaviour of the provinces by offsetting the actions of provincial governments that result in some persons in certain provinces being better off than persons in identical circumstances elsewhere.

The narrow-based view is that the federal government should take as a starting point the level of real income attained by persons after provincial fiscal systems are in place. In this case, the federal government need only be concerned with ensuring that two people who are equally well-off after provincial government budgets are in place ought also to be equally well-off after the federal budget. According to this view, the federal budget need not be concerned with completely offsetting the nationwide horizontal inequities introduced by provincial governments.

The broad-based view of equity described above would require the use of equalization payments to eliminate all interprovincial differences in aggregate per capita net fiscal benefits. Thus, this view calls for full equalization of all interprovincial differences in per capita resource-based tax revenues. This would be financially equivalent to the situation in a unitary state in which all resource-based tax revenues accrued to the central government and were used to finance a uniform set of "provincial" services across the country. It would appear to be the sort of solution implicit in Graham's arguments.[8]

The solution corresponding to the narrow-based view of equity would turn out to require a much smaller reduction of per capita differences in resource-based net fiscal benefits. Since, under this narrow-based view of horizontal equity, these fiscal benefits are considered part of the incomes of persons before federal taxes and transfers, horizontal inequity arises only if the federal tax and transfer system does not tax this fiscal benefit component of income. The solution here would be to add to (substract from) personal incomes in each province an imputation for the amount to which each resident benefited (suffered) as a result of residing in a province with above (below) average per capita resource-based tax revenues and, in effect, taxing this just like any other form of income. This could be accomplished by an equalization program that equalized only a portion of the differences in per capita resource-based tax revenues between provinces, with the proportion being determined by the overall marginal federal tax rate prevailing in each province.[9] The essential underlying value judgment in this case is that it is ethically correct and/or constitutionally necessary to grant property rights to resource-based tax revenues to the residents of the province in which the resources are located.

Therefore, Boadway and Flatters conclude that if we do not wish to attenuate provincial ownership of natural resources as granted by the Canadian constitution, horizontal equity considerations do not call for full equalization of all fiscal benefits based on provincial resource revenues. But this has an efficiency cost to the extent that migrants are attracted by that part of province-specific resource-based fiscal benefits that are not equalized across the country.

Migration and the Ownership of Natural Resource Rents

The Boadway/Flatters analysis clearly requires a prior decision about the ownership of resource rents before it can have practical application. But do resource rents and associated consumption and economic development possibilities belong to the people in the province in which the resources are found? Or should all Canadians regardless of location have an equal claim?

In Canada, conflict over resource rents manifests itself partly in debate over how access to these rents should be apportioned among different levels of government in the federation. Obviously those individuals who believe natural resources are a national heritage tend to favour assignment of a substantial part of resource rents to the national or federal government or, equivalently, the payment of equalization when resource revenues enter fully into the formula for that program. On the other hand, those who believe in the justice of ownership by those who reside in a particular province are inclined towards isolating location specific rents from the federal fiscal system.

Migration is at the heart of this debate in the sense that one could say the underlying conflict over natural resource rents stems fundamentally from the fact that many cannot or will not migrate to the west to share in current or future benefits flowing from provincial oil and gas revenues (Scott, 1980). If migration was costless and if there was no capitalization of oil and gas rents into housing prices, increases in rents from these resources might trigger migration to the west, which would greatly reduce the extent of the current political debate in the federation over the access of different jurisdictions to resource rents. For, in the case postulated, which government actually "owns" resources now, or what any government might do with resource revenues in the future, is irrelevant to the citizen, since any initially unfavourable assignment could be offset by migration. But, migration is not costless. Hence, a choice between the national sharing of resource rents via direct federal access to them (which reduces emphasis on migration as a means of distributing resource rents throughout the country as a whole) and not doing so (and implicitly relying on migration to the west as the sharing mechanism) is a fundamental choice about property rights.

It should be noted, in view of the preceding discussion of the equity-efficiency trade-off, that migration to reap province-specific natural resource rents may in part dissipate those rents by misallocating too much labour to resource-rich provinces and hence by lowering national per capita incomes. And, in view of this rent dissipation, it has been suggested that we might be able to avoid entirely conflict over ownership of western resource revenues. Assume for example that migration to Alberta to "get a piece of the fiscal action" has occurred. Then, do the original residents of Alberta not have the following desirable option open to them (Wilson, Percy, and Norrie, 1980, pp. 26-28)? They could inform recent fiscally induced migrants (as opposed to ones responding to real factor market disequilibrium) that they will give them a share of these rents (an "equalization" payment) equivalent to what they feel they obtained by moving west, if only they will return to their former employments. (This assumes, of course, that the two types of migrants can be distinguished.) The original western residents remind themselves that they are no worse off by this, since they are only transferring what these people are getting now anyway. They then find that the gain in output from the increase in employment in eastern manufacturing industries exceeds by some margin the loss from the contraction of the western industries (since the marginal contribution to output in the west had been lower than that in the east by the amount of the fiscal advantage to a western resident). They and the rest of the country can then take this additional new output, which is a net gain to the country as a whole, export it to France, and thereby provide everyone in Canada with a six-month supply of vintage wine.

It is this wine that we do not receive under the current fiscal arrangements, the physical manifestation of rent dissipation, that is supposed to prompt a solution to the property rights conflict via an "equalization" scheme. But we cannot escape the conflict over natural resource ownership so easily. One reason for this is that the gains from trade discovered above are of interest only to those easterners who have already migrated to the west. There is no reason to believe that the remaining residents of the east will be satisfied by the above solution to rent dissipation, especially if they have no intention of moving westward.

As long as the assignment of resource rents among jurisdictions does not involve complete attenuation of provincial ownership, it has been argued that there will be attempts by the western provinces to prevent in-migration with the associated and further attenuation of the property rights of current western residents (Hartle, 1980). Unless the western provinces in Canada are able to control interprovincial migration, the same natural resource rents will tend to be shared more and more evenly by the national population as easterners move west either to avoid the change in the terms of trade in favour of the west due to higher oil and gas prices, or to attempt directly to get a share of natural resource rents through the fiscal systems of western provinces. This may be one of the reasons why Alberta's resource revenues are not at present fully reflected in higher levels of public services or lower tax rates, but are partly sequestered in the Heritage Fund. It is interesting to note that a recent study of the Alaska case suggests that personal tax reductions are in fact not an effective way of improving the well-being of Alaskans. Kresge and Seiver (1978) found that induced migration would quickly dissipate the gains in per capita disposable income to original residents. Moreover, they found that the resulting increase in population would require additional state spending several times larger than the initial tax cut.

Hence, it can be argued that a choice of federal-provincial fiscal arrangements reflecting an attempt to settle the conflict over the ownership of natural resources will have to be complemented by legislation appropriately defining the ability of provincial governments to regulate interprovincial migration. Debate about such legislation would obviously become more intense the greater the reliance on migration, and the less the reliance on the federal fiscal system as a means of sharing resource revenues throughout the country as a whole.

The Need for and Role of Empirical Evidence on the Relationship between Internal Migration and Fiscal Structure

It should be clear by now that, if there exists a relationship between internal migration and fiscal structure, this may be of considerable importance to the economic well-being of individual Canadians. The sensitivity of migration to interregional differences in fiscal structure may be an important determinant of the level and regional variation of per capita earned incomes, as well as of the nature of provincial property rights in natural resources.[10] Yet, in spite of this potential importance, and although several empirical studies have analysed internal migration in Canada, most have examined only the nongovernmental determinants of migration. The paucity of evidence even on the prior question of whether fiscally induced migration exists has been recently noted by Boadway (1980, pp. 48-90), Vanderkamp (1980, pp. 234-35), and McMillan and Norrie (1980, p. 216), among others. The purpose of the rest of this study is to help fill the gap in our empirical knowledge of that prior question, by estimating the extent and nature of fiscally induced interprovincial migration in Canada.

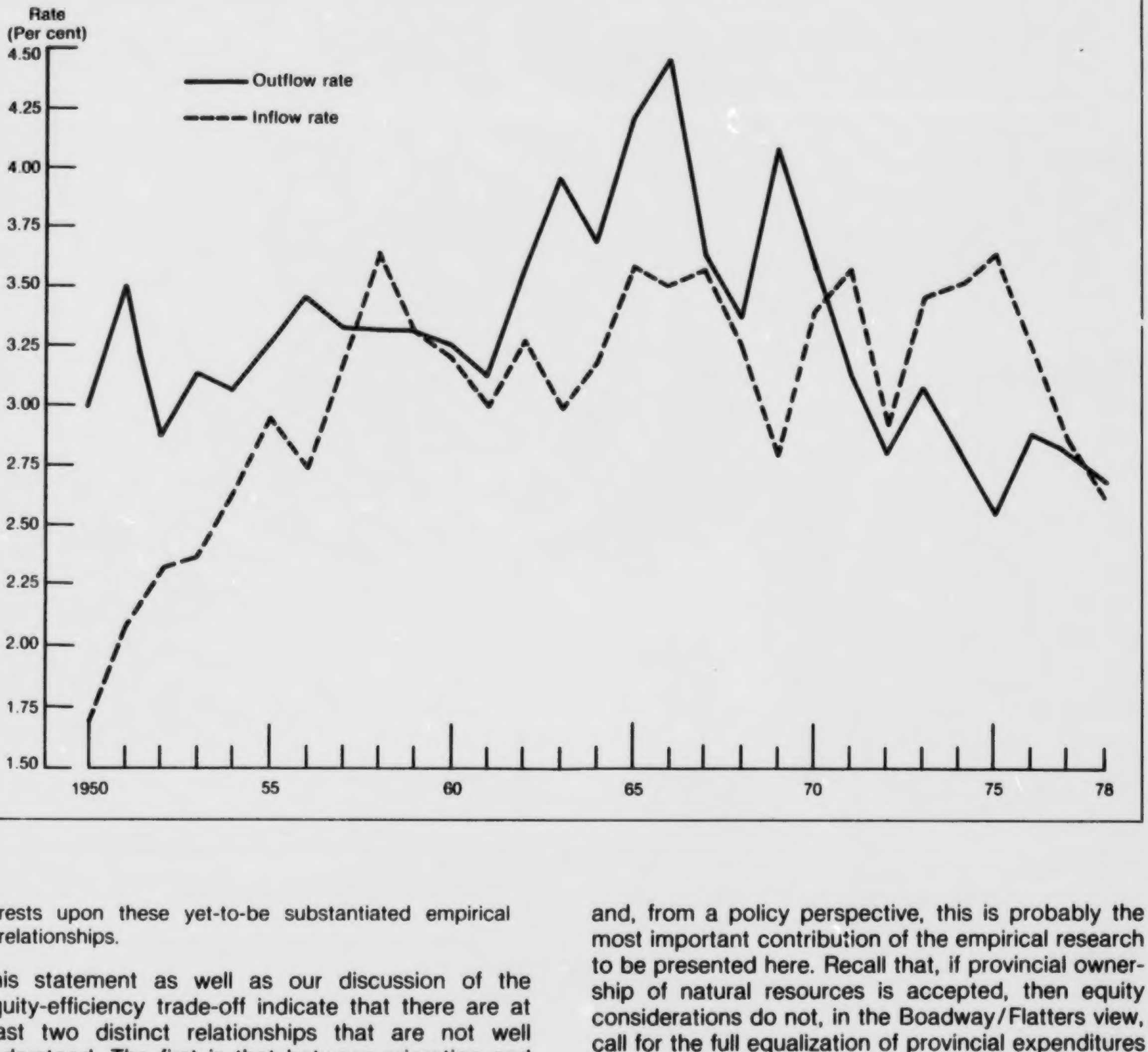
The Purpose of this Study in the Light of the Policy Debates

As Boadway (1980, p. 49) puts the need for research on fiscally induced migration:

> Of all the areas in fiscal federalism, the interrelationships among transfers, migration and development is perhaps the one most ripe for economic research. Much of the case for or against equalization payments

Figure 1-1

Gross Inflow and Outflow Rates of Family Allowance Accounts, New Brunswick, 1950-78



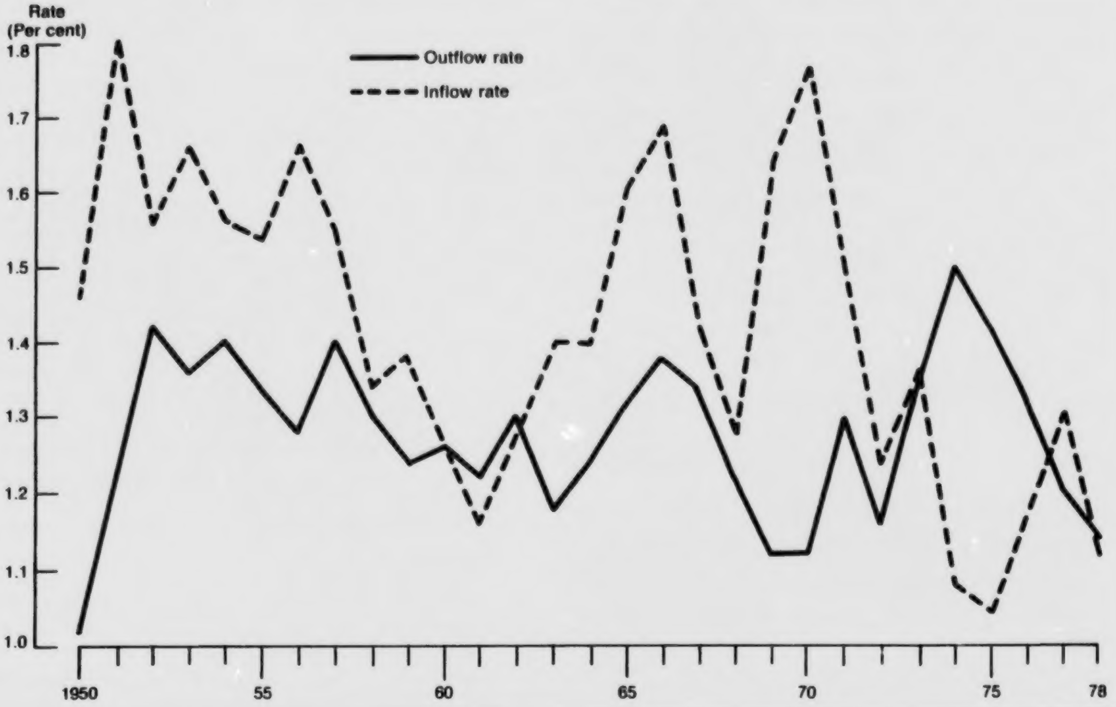
rests upon these yet-to-be substantiated empirical relationships.

This statement as well as our discussion of the equity-efficiency trade-off indicate that there are at least two distinct relationships that are not well understood. The first is that between migration and fiscal structure. The second concerns the implications of migration for economic growth.[11] The empirical research in this study bears directly on the first relationship only. Strictly speaking, it is not designed to, and cannot, in fact, finally resolve debates concerning migration as a determinant of economic growth or regional disparities, a limitation about this sort of research that some authors have ignored (see, for example, Matthews, 1981, p. 280).

Evidence on the extent of fiscally induced migration will, however, indicate whether the equity-efficiency trade-off debate need be of concern to policy makers and, from a policy perspective, this is probably the most important contribution of the empirical research to be presented here. Recall that, if provincial ownership of natural resources is accepted, then equity considerations do not, in the Boadway/Flatters view, call for the full equalization of provincial expenditures financed by natural resource revenues, and this has an efficiency cost to the extent that migrants are attracted by the part of natural resource revenues that is not equalized. But, if the relationship between migration and provincial natural resource revenues is found to be extremely weak, there would obviously be little efficiency cost to less than full equalization. In that case, an equalization formula could be chosen on the basis of equity considerations alone. In the same way, the potentially adverse effect of personal or intergovernmental transfers on regional economic development that concerns Courchene would be of diminished interest to policy makers, if it could be

Figure 1-2

Gross Inflow and Outflow Rates of Family Allowance Accounts, Ontario, 1950-78



shown that fiscal structure had, in fact, little influence on out-migration from the poorer regions of the country.

With respect to the second debate outlined above, which has been stimulated by conflict over ownership of natural resource rents, research on the extent of fiscally induced migration is likely to be of less use in informing contemporary policy choices. Even if it were shown that migration is in fact highly responsive to increases in western oil and gas tax revenues, suggesting that conflict over resource rents could be self-regulating in the long run, this may not be of much comfort to the individual citizen in a world in which migration is costly. Easterners would obviously still prefer to remain in, say, Ontario and have the rents transferred directly to them. They would still press their federal Members of Parliament to argue strongly for direct attenuation of provincial ownership of resources.

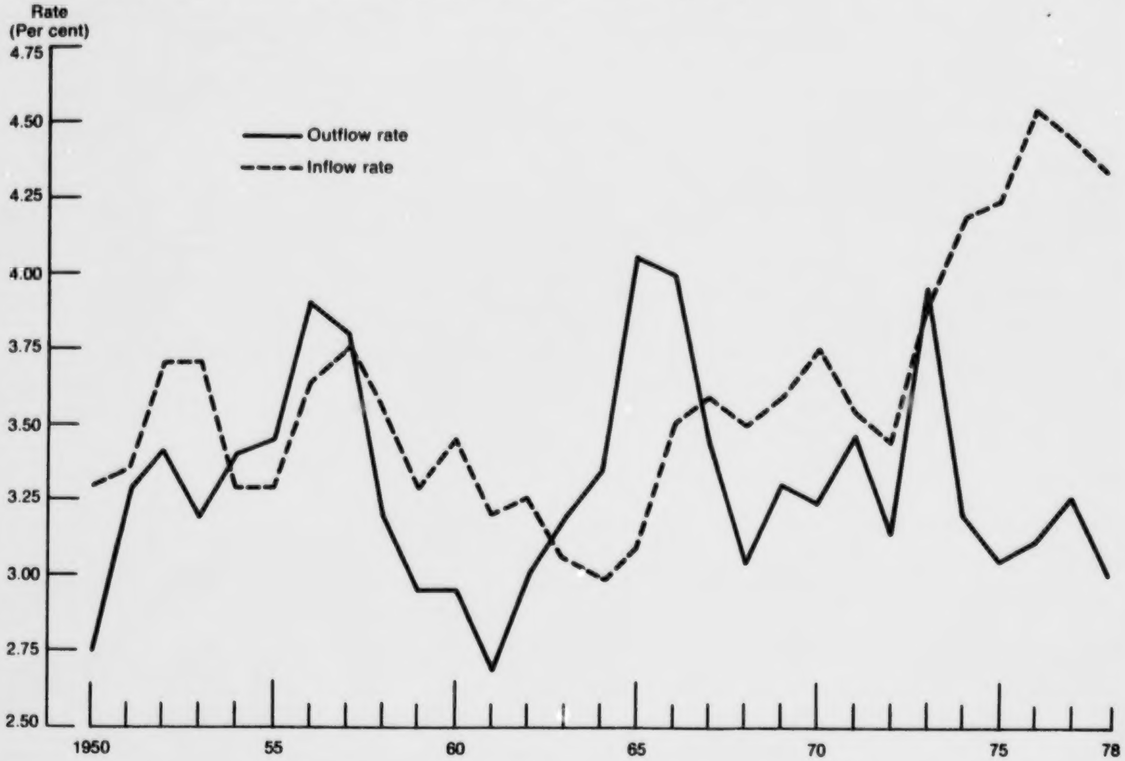
Thus, from a policy perspective, this study bears most importantly on the first of the two debates reviewed in this chapter. The discussion in subsequent chapters will reflect that fact.

Recent Trends in Interprovincial Migration and the Potential Role of Fiscal Structure

Before turning to the details of an econometric search for fiscally induced migrants, it is instructive to look briefly at recent trends in interprovincial migration, and to roughly assess the possibility of a role for fiscal structure in explaining them.

Over the past ten or fifteen years there has evidently been a change in the pattern of interprovincial migration in Canada. After decades of net out-migration, which peaked at 118,000 in the years between 1961 and 1971, the Atlantic provinces began to register a positive interprovincial migratory balance in the early 1970s. At about the same time, Ontario started to show a decline in the size of its traditional in-migration, and actually began showing a migratory deficit in 1974. Alberta, which had experienced four successive phases of positive and negative migratory balances between 1950 and 1967, again entered a period of positive net migration, but this time at historically high rates that since

Figure 1-3
Gross Inflow and Outflow Rates of Family Allowance Accounts, Alberta, 1950-78



1974 have exceeded one per cent of the province's population.

Figures 1-1 to 1-3 illustrate these migration developments for New Brunswick, Ontario and Alberta, and the change in the interprovincial migration pattern suggested in these three figures is confirmed more generally in Table 1-1.[12] After examining the swings in provincial migratory balances indicated by Table 1-1, Boadway and Green (1981, p. 5) have also concluded that there has been a "shift" in historic internal migration patterns. In their view, we have in the 1970s observed for the first time in the last century, simultaneously, an exodus from the central provinces and a net inflow to both Alberta (and British Columbia) and the Maritime provinces.

At first glance, one could be easily tempted to attribute these recent developments in internal migratory balances at least partly to changes that affected, during the same period, the fiscal structure of the provinces concerned.

The flows to the west may have been triggered by the sharp climb in the early 1970s in the price of hydrocarbons in world markets, which produced a considerable growth in natural resource rents, part of which are transmitted to residents of Saskatchewan, British Columbia, and particularly Alberta, through these provinces' fiscal systems. Alberta, for example, collects no sales tax, has the lowest personal income tax rates in the country, and has provided for future financing of public services through its tax-exempt Heritage Fund, the value of which could reach $15 billion by 1984 (Helliwell and Scott, 1981, p. 29). Table 1-2, which shows indirect natural resource tax revenues per capita by province, clearly indicates a substantial and growing differential in favour of the three western most provinces.[13]

The recent positive migratory balance for the Atlantic provinces might be partly the result of changes to the Unemployment Insurance Act that made it easier to qualify for benefits (as of 1977) and

Table 1-1

Quinquennial Net Interprovincial Migration, 1951-80*

	1951-55	1956-60	1961-65	1966-70	1971-75	1976-80
			(Thousands of persons)			
Newfoundland	-3.9	-6.7	-12.6	-19.8	4.1	-6.8
Prince Edward Island	-6.3	-2.4	-2.1	-3.1	2.7	1.7
Nova Scotia	-11.6	-15.2	-21.5	-16.5	10.6	1.3
New Brunswick	-20.5	-8.2	-20.7	-21.5	17.2	6.2
Quebec	-44.9	-31.2	-19.1	-116.3	-81.8	-154.8
Ontario	85.5	68.9	70.1	152.2	-23.5	-53.6
Manitoba	-19.2	-21.8	-24.0	-50.5	-30.4	-49.1
Saskatchewan	-40.1	-50.0	-37.2	-78.9	-37.9	10.4
Alberta	11.2	18.5	-2.6	25.1	49.8	146.3
British Columbia	49.6	48.1	69.6	129.4	89.3	98.4

*The figures in this table do not include moves from or to the Yukon and Northwest Territories.

SOURCE Estimates by the authors for the period 1951-78, and Statistics Canada, *International and Interprovincial Migration in Canada*, Statistics Canada, cat. no. 91-208, for the years 1979 and 1980. See Appendix B.

Table 1-2

Provincial Indirect Natural Resource Revenues Per Capita, by Province, 1968-77*

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
					(In 1971 dollars)					
Newfoundland	2.1	6.20	9.39	12.38	6.56	9.55	33.65	35.11	30.36	35.17
Nova Scotia	3.78	2.92	1.94	1.78	4.00	0.00	0.00	0.24	0.00	3.73
New Brunswick	8.32	11.03	14.95	12.53	16.20	22.21	22.82	18.03	27.12	23.37
Quebec	27.48	27.25	32.37	34.44	29.94	26.91	30.21	36.54	39.47	36.26
Ontario	16.73	20.00	19.30	15.20	14.86	21.57	31.58	13.56	14.17	22.84
Manitoba	11.81	11.32	13.46	11.93	13.28	19.00	29.11	25.79	17.70	12.91
Saskatchewan	49.06	43.68	43.93	44.95	47.72	61.34	210.85	246.13	220.21	237.58
Alberta	204.12	187.03	162.35	170.38	193.34	286.33	560.86	686.33	769.72	982.71
British Columbia	74.07	82.99	74.68	74.65	93.55	130.25	117.75	67.17	68.84	107.90

*This table excludes direct personal and corporate tax revenues that originate in the resource sector.

SOURCE See Appendix A.

for longer periods (as of 1972) in regions where the unemployment rate exceeds the national average, and of increases in the per capita federal financing of the Atlantic region's "balance of payments deficit" with the rest of the country, through equalization payments and other intergovernmental and personal transfer programs. Table 1-3, which summarizes per capita federal transfers to individuals by province, shows that transfers to persons are in fact more generous in the Atlantic provinces than in Ontario, which is the origin for most Atlantic in-migrants and the destination of most Atlantic out-migrants, and that the Atlantic (over Ontario) advantage in this respect has been growing over time. And Table 1-4, which gives the per capita amounts of federal unconditional transfers to the provinces (mainly equalization payments) clearly shows per capita grants to the Atlantic provinces growing relative to Ontario (as well as to other more westernly provinces).

It would be a serious error, of course, to overlook the impact on migration of nongovernmental economic phenomena, such as the 1970 and 1975 recessions in Ontario and the recent rapid growth in private sector employment in the west, in order to explain the decline in net in-migration to Ontario, the decline in net out-migration from the Atlantic provinces, and the increased net inflow to the west. Although we are interested specifically in the relationship between internal migration and fiscal structure, it

Table 1-3

Federal Transfer Payments to Individuals, Including Unemployment Insurance, Per Capita, and as a Proportion of Labour Income, by Province, Selected Years 1952-77

	1952	1957	1962	1967	1972	1977*
			(In 1971 dollars)			
Newfoundland	87.11	128.47	155.04	180.71	320.47	511.63
	(.152)	(.165)	(.180)	(.157)	(.221)	(.264)
Nova Scotia	110.63	141.46	178.61	217.52	337.44	464.00
	(.137)	(.150)	(.171)	(.162)	(.187)	(.202)
New Brunswick	107.71	149.11	172.27	203.24	338.39	496.18
	(.148)	(.174)	(.177)	(.154)	(.197)	(.227)
Quebec	82.12	107.77	119.87	134.26	252.83	377.98
	(.077)	(.083)	(.082)	(.071)	(.111)	(.126)
Ontario	97.33	123.16	145.82	168.70	258.16	319.72
	(.066)	(.069)	(.077)	(.070)	(.085)	(.086)
Manitoba	101.17	131.24	180.41	187.28	283.03	349.59
	(.098)	(.103)	(.129)	(.105)	(.126)	(.121)
Saskatchewan	89.05	112.68	198.60	171.54	268.30	325.59
	(.149)	(.128)	(.207)	(.135)	(.172)	(.137)
Alberta	88.80	109.19	153.22	152.07	238.36	254.98
	(.093)	(.084)	(.110)	(.083)	(.101)	(.077)
British Columbia	129.30	158.32	189.94	207.44	323.12	390.73
	(.088)	(.092)	(.110)	(.094)	(.117)	(.107)

*If unemployment insurance payments are removed from this table, the analogous figures for "other" transfers to persons as a proportion of labour income in 1977 are: Newfoundland (.141), Nova Scotia (.139), New Brunswick (.137), Quebec (.076), Ontario (.066), Manitoba (.100), Saskatchewan (.117), Alberta (.066), British Columbia (.076). Comparing Newfoundland to Alberta for both these latter figures and those in the table suggest that unemployment insurance payments enhanced regional variation in the transfer system.

SOURCE See Appendix A, and calculations by the authors.

Table 1-4

Unconditional Transfers from the Federal to Provincial Governments Per Capita, by Province, Selected Years 1952-77

	1952	1957	1962	1967	1972	1977*
			(In 1971 dollars)			
Newfoundland	28.15	39.09	91.17	163.12	226.27	314.13
Nova Scotia	4.46	30.06	54.95	111.29	161.91	275.01
New Brunswick	4.52	20.29	59.16	117.70	178.90	255.39
Quebec	1.12	10.42	19.16	45.41	81.46	137.76
Ontario	1.08	0.90	0.96	0.75	0.67	19.21
Manitoba	3.12	20.22	23.23	51.66	81.03	147.54
Saskatchewan	3.13	26.15	39.94	37.17	168.27	49.32
Alberta	3.10	16.00	12.15	3.26	1.77	23.63
British Columbia	1.51	6.53	0.00	0.95	0.90	19.24

*The 1977 figures include transfers with respect to the 1972 revenue stabilization program, under which the federal government agreed to temporarily (until 1978) cushion provincial income tax revenues against cyclical downturns in aggregate activity. Removal of the revenue guarantee would reduce the figures for Ontario, Alberta, and British Columbia to about 1.0.

SOURCE See Appendix A, and calculations by the authors.

is essential to take into account the influence of other "private" economic factors determining migration. It could well be that individuals are overwhelmingly concerned with job prospects when choosing between labour markets, and that the expectation of fiscal benefits is not of significant importance as a determinant of migration decisions. However, in view of the ease with which recent developments in interprovincial migratory trends may, if only at first glance, be plausibly associated with contemporaneous developments in various aspects of fiscal structure, it would seem that it is an opportune time for empirical research on the extent of fiscally induced interprovincial migration in Canada.

In the next chapter, we begin our own work on this topic with a review of existing empirical research.

2 "Interprovincial Migration and Economic Adjustment": A Preliminary Reconsideration with Emphasis on Unemployment Insurance

Introduction

Essentially the only evidence on fiscally induced internal migration available for review is contained in Courchene's (1970) pioneering article "Interprovincial Migration and Economic Adjustment."

Courchene's results were based on two migration data sources. One source was the 1961 census, where a respondent's residence in 1961 was compared with that in 1956. The other source was family allowance data for the period 1952 to 1967, using family allowance accounts transferred between provinces as the migration flow measure. Courchene used pooled time-series cross-section samples that included all provinces. No results based on disaggregation of the data by province or region were reported.

Estimation based on the family allowance data indicated that both unemployment insurance transfers and total federal transfer payments to persons in a representative province had exerted a statistically significant effect on out-migration. These components of fiscal structure were shown to have reduced out-migration from the representative province.[1] The census data results indicated that federal unconditional grants to the provinces also have had a statistically significant, negative impact on out-migration.[2]

As well as furnishing the solitary substantial piece of empirical evidence on the relationship of migration and fiscal structure,[3] it is clear from the discussion in Chapter 1 that Courchene has also been at the centre of the normative debate on the efficiency implications of fiscally induced migration, persuasively developing the transfer dependency thesis and, with his own empirical research as background, arguing for greater reliance on private market forces as a means of increasing efficiency and reducing regional disparities. Thus it seems appropriate to begin any empirical re-examination of the relationship of internal migration and fiscal structure by considering the robustness of Courchene's estimates in the light of the additional data that are now available to us.

Accordingly, in this chapter, we present a re-estimation of selected equations from Courchene's 1970 study based on revised family allowance data for the period 1951 to 1978. The results of this estimation will clearly suggest that there is a problem with the manner in which Courchene has modelled the migration impact of unemployment insurance. Therefore, in this chapter, we also develop and estimate one substantive variation on Courchene's equations that embodies a more desirable treatment of the role of unemployment insurance. The basic treatment of unemployment insurance in this revised estimating equation will, with some amendments, form part of the new econometric model of fiscally induced migration that is constructed in the next chapter.

Re-estimating Courchene's Equations

A Selective Choice of Equations

Courchene's paper deals with several migration hypotheses besides those relating to fiscal structure, and his estimating equations reflect the breadth of his concerns. However, since this study is concerned with the role of fiscal structure, we have chosen for re-estimation, using revised data, Courchene's equations 3 and 4 of his Table VI. These equations contain almost all of the fiscal variables that he considered.[4]

Our version of Courchene's equations 3 and 4 is given in Table 2-1 as estimating equations I and II, where all variables are in logarithmic form unless otherwise stated. (The other equations listed in the table will be introduced later.) Definitions of variables in equations I and II and remarks on important differences between our definitions and Courchene's are as follows. As in Courchene (1970), it is to be understood that all variables are deflated by the consumer price index (1971 = 100) when appropriate.[5]

Table 2-1

Summary of Chapter 2 Estimating Equations

Expected signs (Equations I to IV only)			?	+	-	+	-	+	-			+	-	+	-		-	-
I	$FMAC_{ij}/AC_i$	=	C	S_1	S_2	S_3	D_{ij}	YL_j/E_j	YL_i/E_i			U_i	U_j		UI_i/YL_i			
II	$FMAC_{ij}/AC_i$ (linear)	=	C	S_1	S_2	S_3	D_{ij}	$(YL_j/E_j)/(YL_i/E_i)$ (+)				U_i	U_j	ED_i	UI_i/YL_i		TRF_i/YL_i	
III	$FMAC_{ij}/AC_i$	=	C	S_1	S_2	S_3	D_{ij}	YL_j/E_j	YL_i/E_i			U_i	U_j	ED_i	UI_i/YL_i		TRF_i/YL_i	GU_i/L_i
IV	$FMAC_{ij}/AC_i$	=	C	S_1	S_2	S_3	D_{ij}	YL_j/E_j	YL_i/E_i			U_i	U_j	ED_i	UI_i/YL_i		$TRF2_i/YL_i$	GU_i/N_i
V	$FMAC_{ij}/AC_i$	=	C	S_1	S_2	S_3	D_{ij}	AWW_j	AWW_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	U_i	U_j	ED_i	AUI_j/AWW_j	AUI_i/AWW_i	$TRF2/YL_j$	GU_i/N_i
VI	$FMAC_{ij}/AC_i$	=	as for V, but also including (AUI_j/AWW_j).T3 (AUI_i/AWW_i).T3 $(TRF2_i/YL_i)$.T2 (GU_i/N_i).T2															

NOTE All variables are in log form except the constant term C, the dummy variables S_1, S_2, S_3, and except in equation II, where all variables are in linear form except ED_i, which remains in log form. $T2 = 0$ for first half of estimation period, $T2 = 1$ thereafter. $T3 = 0$ before 1972, $T3 = 1$ for 1972 and thereafter. Subscripts *i* and *j* refer respectively to the province of origin and the province of destination. See Appendix A for definition of variables.

SOURCE See text.

$FMAC_{ij}/AC_i$ = Family allowance active accounts transferred between provinces *i* and *j*, divided by the total number of active accounts in province *i*. This family allowance measure of migration flows is an annual sum of monthly observations, and hence does include families moving more than once during the year, provided that the family allowance account has been officially transferred between regional offices. The definition of accounts *AC* used here is "active accounts" rather than "accounts in pay." The former consists of the latter plus a small number of accounts registered but to which no disbursements are made for various reasons. We have revised the family allowance migration series *FMAC* and *AC* using monthly data supplied to us by Health and Welfare Canada as outlined below and in Appendix B.

S_1, S_2, S_3 = Shift variables. S_1 is unity for out-migration from the Atlantic provinces to Ontario and also for out-migration from New Brunswick to Quebec. S_2 is unity wherever the dependent variable is out-migration from Quebec. S_3 is unity for out-migration from Saskatchewan to Alberta. For all other observations, these dummy variables take a value of zero. S_1 and S_2 are intended to capture the role of French language and culture in the migration decisions. S_1 also captures the effect on out-migration from Atlantic Canada of the relatively long distances required to reach the closest English-speaking province (i.e., Ontario). The rationale for S_3 is unclear in Courchene's paper.

D_{ij} = Trans-Canada road distance between major population centres. This variable proxies the direct and indirect costs of moving.

YL_i/E_i, YL_j/E_j = Labour income and supplementary benefits (*YL*) per person employed (*E*) in provinces *i* and *j*, respectively. Courchene's labour income data were based on work by Denton (1966), an updated version of which was not available to us. Our data are from Statistics Canada publications.

U_i, U_j = Unemployment rate in provinces *i* and *j*, respectively. Presumably, these variables reflect the state of labour markets in the origin and destination provinces.

ED_i = Per cent of the population (five years and older) in province *i* not in school but with some university schooling. Courchene used the proportion of the labour force having an education beyond Grade 10. However, that variable exhibits less interregional variation over the more up-to-date sample to be used here than does ED_i.

UI_i/YL_i = Total unemployment insurance payments to persons in province *i* divided by labour income in province *i*. This variable roughly measures the generosity of the unemployment insurance system in province *i*. We shall have considerably more to say about this variable later.

TRF_i/YL_i = Total federal transfers to persons in province *i* divided by labour income in province *i*. This measures the generosity in province *i* of the federal personal transfer payment system as a whole. *TRF* is deflated by *YL* to allow for the possibility that a dollar of transfer income is "worth" more in a low-income province than in a high-income province (Courchene, 1970, p. 554). Note that TRF_i includes UI_i.

Exact sources of these and other data used in this study are given in Appendix A.

The choice of explanatory variables in equations I and II and the expected signs of coefficients given in the first row of Table 2-1 are consistent with the standard human capital migration literature as surveyed, for example, by Greenwood (1975) or Rothenberg (1977). Courchene does in fact consider these equations to have been based on the human capital theory of migration behaviour. In this view, following Schultz (1961) and Sjaastad (1962), an individual migration decision is a decision to invest in one's own human capital. The gross return from the migration "investment" is the discounted present value of the expected future money income stream in the destination plus the present value of nonmonetary items such as the psychic income derived from residence in that location. The costs of this investment are the present value of the expected foregone money and psychic income streams in the origin, plus the money and nonmonetary costs directly associated with moving. Migration, in the human capital approach, is positively related to the size of the expected net return on the migration investment.

Econometrically, the result of this approach is an estimating equation like equation I or II in which explanatory variables are, as a set, supposed to serve as a proxy for the expected net return on the migration decision. The log form of the equations in Table 2-1 is desirable because it is consistent with diminishing marginal utility of income and therefore with risk aversion, which, it is plausible to assume, is a characteristic of migrants.

To aid those readers unfamiliar with the human capital theoretical basis of a migration equation, further description of the approach will be forthcoming later in the chapter. At this point, however, it is convenient to consider instead the absence in equations I and II of a variable representing the migration influence of unconditional grants.

In view of the issues raised in the first chapter, it is certainly desirable that unconditional grants such as equalization be represented in the estimating equations. The reason that this is not so in equations I and II is that Courchene included an unconditional grant variable only in equations intended for estimation with census data, while equations I and II were used by him only in conjunction with family allowance data. We shall use only family allowance data here but, since time series on the grant variable Courchene used is available, we shall estimate a variation on equation I that includes this variable. That variation is listed in Table 2-1 as equation III.[6] It includes the Courchene grant variable GU_i/L_i, defined as unconditional grants to province *i* divided by the labour force in that province. As in Courchene (1970), *GU* consists of equalization payments (the major component), statutory subsidies specified in the British North America Act, and Atlantic Provinces Adjustment Grants. In the 1970s, which is beyond Courchene's sample period, *GU* also includes the revenue guarantee or stabilization payment given to the provinces by the federal government. According to Courchene, the coefficient on GU_i/L_i should have a negative sign.

Equation III also includes the transfer to persons variable TRF_i/YL_i and the unemployment insurance variable UI_i/YL_i. Thus, equation III contains all the fiscal variables that appeared in Courchene's paper.

The Dependent Variable and the Family Allowance Data Set

The dependent variable $FMAC_{ij}/AC_i$ in equations I, II, and III is a gross out-migration rate.[7] This choice of a gross rather than a net migration variable is desirable because better empirical results can be expected from the gross migration model, for at least three reasons. First, in net migration models, the effects of some variables such as distance having the same sign in gross in-migration and gross out-migration equations are "washed out," while those of unequal sign variables such as employment income are amplified (Greenwood, 1975, p. 408). Second, the tendency for gross in-migration and gross out-migration rates to be either high or low means that important relationships between growth performance of a region and mobility may be masked in net migration models (Richardson, 1979, p. 110).[8] Third, there is the aggregation problem of modelling return migration together with "first time" migration in the net model, since return migrants and "first time" migrants are likely to be motivated differently (Vanderkamp, 1971).

The actual measure of family allowance gross out-migration used here is based on a revised family allowance data series. The revisions in this data are threefold:

- The series has been extended back to 1950 and forward to 1978. Courchene's data cover the shorter period 1952 to 1967.

- The revised series is consistently based on accounts received in a province rather than on accounts sent to a province. Although the two series are similar, the former is more likely to reflect a move that has been made.

- Since all other data are on a calendar-year basis, a family allowance series on a calendar-year basis has been created by using the appropriate monthly observations. Gross family allowance data published by Statistics Canada are on a June-to-May basis.

A more detailed discussion of the family allowance data revision is to be found in Appendix B.

Estimation Results

The results of estimation of equations I, II, and III for Canada as a whole using the revised family allowance data are given in Table 2-2.[9] All variables perform as expected except *UI*. The coefficient on UI_i/YL_i is clearly positive and significant in equations II and III.

Since TRF_i includes UI_i, we have also estimated equation IV using $(TRF_i - UI_i)/YL_i$ instead of TRF_i/YL_i as the transfer to persons variable. This new variable is denoted $TRF2_i/YL_i$. Equation IV allows us to consider the possibility that the effect of unemployment insurance on out-migration is negative, but less so than that of other transfers, in which case the coefficient on UI_i/YL_i in equations II and III should be positive. Equation IV also uses GU_i deflated by population N_i, rather than by labour force size L_i, since the entire population of a given province may benefit from federal unconditional grants to the provinces.

However, in spite of these improvements in the definition of fiscal variables, estimation of equation IV offers only a marginal improvement over previous results with respect to *UI*. In equation IV, the coefficient on UI_i/YL_i still has the wrong sign, but it is insignificant. The other fiscal variables continue to perform as Courchene predicted. Other transfers to persons and unconditional grants both significantly retard out-migration.

Considering equations I to IV as a whole, it would appear that Courchene's statistical results concerning the role of fiscal structure are only partially confirmed. In particular, the retarding influence of unemployment insurance on out-migration found by Courchene is not a feature of these results.

The Role of Unemployment Insurance in a Migration Equation

The poor performance of *UI* in equations I to IV suggests that a careful look at the modelling of the role of unemployment insurance in a migration context is in order. Improper specification in equations I to IV seems likely because the other personal transfer variable $TRF2_i/YL_i$ worked as expected in equation IV. Yet in the same equation, *UI*, which is perhaps the single most important personal transfer program, had no significant influence on migration decisions. Therefore, in this section, we consider in some detail the question of how best to incorporate the unemployment insurance system into an explanation of interprovincial family allowance migration flows. The ensuing discussion will lead to a substantial variation on Courchene's estimating equations, the results of the estimation of which will be reported below.

Extension of the Todaro/Laber/Chase Model of Income Expectations

We have found that an extension of the Todaro (1969) method of proxying employment income expectations in a migration context leads to a theoretically more satisfactory method of modelling the role of unemployment insurance.

Laber and Chase (1971) have applied the Todaro modelling of income expectations to the case of interprovincial migration in Canada with good empirical results. Their starting point is the basic human capital model of migration, in which migration from province *i* to province *j* is assumed to be positively related to the net present value of the migration "investment." Following Laber and Chase, this net present value can be written as:

$$(2.1)\quad NPV_{ij} = \frac{PE_j \cdot W_j - PE_i \cdot W_i}{r_i} - C_{ij},$$

where *i* is the province of origin and *j* is the destination province, W_k is permanent income if employed in province *k*, and PE_k is the probability of employment there. The migrant's discount rate is r_i, and C_{ij} is the present value of total direct moving costs less the present value of the net increase (possibly negative) in psychic incomes associated with the move. $PE_k \cdot W_k$ is, of course, expected permanent income in province *k*.

The discount rate is usually assumed to be constant for all provinces and hence need not appear in estimating equations like those in Table 2-1, which simply consist of a set of variables thought to be good proxies for the components of NPV_{ij}. W_k can be proxied by a current actual average income variable, such as income per employed person, YL_k/E_k, on the assumptions that this is highly correlated with W_k,

Table 2-2

Estimating Equations for Out-migration from All Provinces Except Prince Edward Island, 1951-78

Equation	Variables										R^2 *S.E.E.* *D.F.*
I	-6.117	$+.859S_1$	$-1.427S_2$	$+.410S_3$	$-1.107D_{ij}$	$+2.529YL_j/E_j$	$-1.125YL_i/E_i$	$+.582U_i$	$-.777U_j$	$-.485UI_j/YL_j$	.732
	(-17.26)	(11.11)	(-26.62)	(2.84)	(-50.62)	(32.61)	(-14.28)	(8.60)	(-23.51)	(-9.33)	.724
											2006
II (linear)	.002	$+.006S_1$	$-.003S_2$	$+.008S_3$	$-.000001D_{ij}$	$+.006(YL_j/E_j)/(YL_i/E_i)$	$+.012U_i$	$-.022U_j$	$+.001ED_i$	$+.024UI_j/YL_j$	.663
	(6.78)	(22.58)	(-16.75)	(17.39)	(-29.91)	(25.04)	(3.87)	(-12.85)	(9.67)	(3.45)	.002
	$-.034TRF_j/YL_j$										2005
	(-11.74)										
III	-5.799	$+.740S_1$	$-1.866S_2$	$+.608S_3$	$-1.133D_{ij}$	$+3.303YL_j/E_j$	$-2.120YL_i/E_i$	$+.429U_i$	$-.801U_j$	$+.006ED_j$	.770
	(-11.66)	(10.25)	(-30.61)	(4.50)	(-55.52)	(38.98)	(-15.03)	(6.65)	(-25.74)	(0.12)	.672
	$+.379UI_j/YL_j$	$-1.638TRF_j/YL_j$	$-.045GU_j/L_j$								2003
	(5.35)	(-13.95)	(-6.08)								
IV	-6.641	$+.750S_1$	$-1.894S_2$	$+.590S_3$	$-1.138D_{ij}$	$+3.281YL_j/E_j$	$-2.110YL_i/E_i$	$+.452U_i$	$-.793U_j$	$+.009ED_j$	.768
	(-13.72)	(10.35)	(-29.89)	(4.36)	(-55.48)	(38.61)	(-14.66)	(6.98)	(-25.42)	(0.19)	.675
	$+.029UI_j/YL_j$	$-1.328TRF2_j/YL_j$	$-.047GU_j/N_j$								2003
	(0.51)	(-13.30)	(-6.31)								
V	-1.616	$+1.084S_1$	$-1.646S_2$	$+.678S_3$	$-1.136D_{ij}$	$+3.743AWW_j$	$-1.954AWW_i$	$+.025\Delta E_j/L_j$	$-.007\Delta E_i/L_i$	$+.033U_j$	.716
	(-5.59)	(13.76)	(-25.00)	(4.50)	(-49.65)	(12.39)	(-6.36)	(4.18)	(-1.09)	(0.87)	.747
	$-.237U_j$	$-.045ED_i$	$-1.896AUI_j/AWW_j$	$+.914AUI_i/AWW_i$	$-.749TRF2/YL_j$	$-.048GU_j/N_j$					2000
	(-6.49)	(-0.92)	(-5.08)	(2.44)	(-9.14)	(-5.63)					
VI	-4.059	$+1.066S_1$	$-1.562S_2$	$+.505S_3$	$-1.163D_{ij}$	$+3.457AWW_j$	$-1.104AWW_i$	$+.026\Delta E_j/L_j$	$-.004\Delta E_i/L_i$	$-.029U_i$	.741
	(-10.07)	(14.09)	(-24.33)	(3.49)	(-52.90)	(11.47)	(-3.21)	(4.45)	(-0.74)	(-0.73)	.714
	$-.257U_j$	$-.076ED_i$	$-3.490AUI_j/AWW_j$	$-.093AUI_i/AWW_i$	$-.599TRF2_j/YL_j$	$-.031GU_j/N_j$	$+.144(AUI_j/AWW_j)\cdot T3$	$-1.614(AUI_j/AWW_j)\cdot T3$	$+.336(TRF2_j/YL_j)\cdot T2$	$+.0004(GU_j/N_j)\cdot T2$	1996
	(-6.82)	(-1.59)	(-8.79)	(-0.23)	(-7.49)	(-3.07)	(0.27)	(-3.08)	(11.44)	(0.03)	

NOTE All variables are deflated by the Canadian consum[illegible] index (1971 = 100) where appropriate. Summary statistics: R^2 is unadjusted. *S.E.E.* is the standard error of estimate. *D.F.* is the degrees of freedom appropriate for the *t*-statistics given in brackets.

SOURCE Estimates by authors.

that this relationship between W_k and YL_k/E_k is captured by the coefficient on YL_k/E_k, and, since we must use a pooled time-series cross-section sample, that the relationship between W_k and its proxy is constant across provinces.[10] C_{ij} is usually proxied by distance D_{ij}.[11]

Laber and Chase were not concerned with fiscally induced migration, but fiscal determinants of migration might be added to the list of explanatory variables in a straightforward fashion by regarding W_k as comprehensive income, including net fiscal benefits, instead of simply as labour income. In this way, the fiscal variables used by Courchene might be added to the list of variables that together serve as a proxy for NPV_{ij}. Increases in UI_i/YL_i, $TRF2_i/YL_i$, or GU_i/N_i would increase W_i to some extent, and therefore could be expected to reduce out-migration from province i, as indicated in Table 2-1. However, as will be demonstrated below, this justification for the presence of the fiscal variables in Courchene's equations does not adequately acknowledge the presence of the PE_k's in equation (2.1). And when this is done, a different and more desirable specification than that used by Courchene emerges with respect to the role of unemployment insurance.

The Todaro model of the probability of employment used by Laber and Chase is consistent with what Miron has called a "bingo model" of the hiring process: all new job openings are assumed to be filled within one period of time, and these positions are filled randomly from among the ranks of the stock of unemployed. The probability of being employed in province k at time t, PE_{kt}, is then estimated by:

$$(2.2)\quad PE_{kt} = \Delta E_{kt}/UE_{kt},$$

where ΔE_{kt} is the absolute growth in employment between times $t-1$ and t in province k, and UE_{kt} is the pool of unemployed at time t in province k.

Expected employment income YLE_{kt} in the Todaro model is just the product of an employment income variable and this probability. If we use YL_{kt}/E_{kt} to represent income if employed, we have for expected employment income:

$$(2.3)\quad YLE_{kt} = PE_{kt} \cdot (YL_{kt}/E_{kt}).$$

This expected employment income variable is essentially the one that was used by Laber and Chase.[12]

Extension to Incorporate Unemployment Insurance

The expected income variable defined in equation (2.3) is not adequate in the presence of an unemployment insurance system however. Given the existence of an unemployment insurance system, the migrant will also have an expectation of unemployment insurance earnings approximately equal to (ignoring the time subscript):

$$(2.4)\quad UIE_k = (1 - PE_k) \cdot (UI_k/UE_k).$$

Thus the explanatory variable proxying total money income expectations that is suggested by the Todaro/Laber/Chase version of the human capital model is YLE plus UIE, rather than just YLE.[13] This sum is denoted W_k in equation (2.5):

$$(2.5)\quad \begin{aligned} W_k &= YLE_k + UIE_k \\ &= PE_k \cdot (YL_k/E_k) + (1 - PE_k) \cdot (UI_k/UE_k). \end{aligned}$$

Laber and Chase did not use UIE as an explanatory variable, which is a correct specification only if expected unemployment insurance earnings are zero. Moreover, it is obvious from the above discussion that UIE should enter for both origin and destination, as do the variables reflecting employment income differentials. Courchene used only the origin value of his unemployment insurance variable, UI_i/YL_i. But clearly the same logic that leads to the inclusion of both origin and destination employment income variables in equations I, II, and III also requires that UIE_j should appear in an estimating equation whenever UIE_i does. This point obviously applies to all fiscal variables, though in this chapter we shall not follow through and revise all the estimating equations so far introduced accordingly.

To allow for the possibility that a dollar of current labour income and a dollar of current unemployment compensation may not yield the same increase in the NPV of equation (2.1), YLE_i, YLE_j, UIE_i, and UIE_j could all be entered separately in a migration estimating equation. One reason for this is given by Rothenberg (1977, p. 194). Adjusting income expectations for unemployment insurance (as in equation (2.5)) may be appropriate for beginning earnings of migrants but, if a potential migrant considers in general his lifetime income prospects, the simple addition of expected unemployment compensation probably overstates the importance of the unemployment insurance system in the calculation of the net present value of the migration decision. Another reason for entering *YLE* and *UIE* separately is that both incomes are received with different conditions attached. Hence, the utility maximization lying beneath the maximization of *NPV* in equation (2.1) is subject to different constraints in each case. Additionally, since "working" may be an act that gives some utility independently of employment income, we could enter the components of *YLE* and *UIE* separately. That is, we could use all of PE_i, PE_j, YL_i/E_i, YL_j/E_j, UI_i/UE_i, and UI_j/UE_j as explanatory variables. This would also permit us to look at the migration influence of the unemployment insurance system separately from that of employment expectations.

While in principle equation (2.5) introduces unemployment insurance into the Todaro/Laber/Chase model, there is the problem that UI_k/UE_k is probably not a good measure of the average unemployment insurance benefit per recipient in province *k*. This is because the number of unemployed persons UE_k does not necessarily correspond to the number of persons receiving benefits. UE_k is measured by the Labour Force Survey, and not all of those individuals currently classified as unemployed by this survey need be receiving an unemployment insurance cheque.[14] Therefore, in the list of explanatory variables, it seems reasonable to replace UI_k/UE_k with AUI_k, the average unemployment insurance weekly payment in province *k*.

It is also desirable that AWW_k, the average weekly wage in province *k*, replace YL_k/E_k as the proxy for employment income. After substitution of AUI_k for UI_k/UE_k, equation (2.5) can be rewritten to incorporate AWW_k in the following way:

$$(2.6)\quad W_k = PE_k \cdot (H_k \cdot AWW_k) + (1 - PE_k) \cdot (K_k \cdot AUI_k),$$

where H_k is the average number of weeks worked in province *k*, and K_k is the average number of weeks in province *k* for which unemployment insurance is received. $H_k \cdot AWW_k \cdot E_k/E_k$ is just YL_k/E_k but, since H_k varies cyclically, and hence is likely to be highly correlated with PE_k, it is reasonable to include in an estimating equation just PE_k (to capture both variations in the probability of employment and variation in duration) and AWW_k, as proxies for the first term on the right-hand side of equation (2.6). Moreover, since K_k and PE_k are also likely to be correlated, it appears that only AUI_k need be added to the list of explanatory variables to complete the proxy for W_k.

The Choice of an Index of Unemployment Insurance Generosity

The effective generosity of the unemployment insurance system can vary systematically with income for at least two reasons. First, the same dollar of transfer income will be more valuable to a lower-income individual if the marginal utility of (transfer) income increases as income falls. Secondly, since unemployment insurance benefits are proportional to the previous wage of a beneficiary only up to a predetermined ceiling or cut-off wage, beyond which unemployment insurance payments are constant regardless of employment earnings, the effective unemployment insurance benefit/replacement ratio will vary systematically with the employment income of migrants.

Accordingly, to allow for the possibility that the unemployment insurance system will be "worth" more for these two reasons in provinces with relatively low average employment incomes, we can use AUI_k/AWW_k, which is a measure of the actual average benefit/replacement ratio, instead of AUI_k, to reflect the effective generosity of the unemployment insurance system in province *k*.[15]

This parallels the use by Courchene of transfers to persons deflated by labour income in equation II. The need for this kind of normalization of AUI_k stems fundamentally from the fact that the family allowance migration flows include migrants from all income classes.

It is important to note that using AUI_k/AWW_k instead of Courchene's unemployment insurance generosity index avoids problems that may stem from the fact that Courchene's variable UI_k/YL_k fluctuates with economic activity independently of the generosity to individuals of the unemployment insurance system *per se*. To see that UI_k/YL_k is cyclically sensitive, consider a situation in which aggregate activity in region *k* is on the rise. In that case, the average duration of unemployment will tend to fall, as will the absolute number of unemployed; this will tend to reduce U_k. Moreover, the average duration of employment and the absolute number of employed will likely be increasing; this will tend to increase YL_k. Hence, UI_k/YL_k will tend to fall. The tendency of UI_k/YL_k to move counter-cyclically independently of unemployment insurance generosity may be the reason for the positive coefficient on this variable in equations I to IV in Table 2-2. If out-migration from province *i* increases when aggregate activity declines there, and if this relationship between aggregate activity and migration is not adequately captured by other variables in these equations, then increases in UI_i/YL_i could be associated with increases in out-migration.

Table 2-3

Estimating Equation V for Out-migration from and to each Province Except Prince Edward Island, 1951-78

	C	S_1	S_2	S_3	D_{ij}	AWW_j	AWW_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	U_i	U_j	ED_i	AUI_j/AWW_j	AUI_i/AWW_i	$TRF2_i/YL_i$	GU_i/N_i	R^2 S.E.E. D.F.
Newfoundland																	
From:	9.359	1.473			-2.145	10.700	-9.392	.023	-.007	.002	-.018	.135	5.287	-6.112	.474	-.286	.858
	(6.54)	(10.24)			(-14.00)	(9.32)	(-8.10)	(1.90)	(-0.67)	(0.02)	(-0.14)	(1.19)	(4.88)	(-4.84)	(0.88)	(-2.44)	.472
																	210
To:	3.675		-1.624		-1.746	-.551	.314	.007	.022	.330	-.103	.362	-2.228	1.818	-.772	.001	.887
	(4.02)		(-16.09)		(-17.09)	(-0.49)	(0.31)	(0.78)	(2.28)	(3.77)	(-1.24)	(3.60)	(-2.71)	(2.33)	(-4.97)	(0.10)	.391
																	210
Nova Scotia																	
From:	-.957	1.461			-.931	9.737	-10.172	.017	-.015	-.710	.371	.045	1.987	-1.444	.105	.014	.869
	(-1.07)	(14.15)			(-16.18)	(11.57)	(-10.84)	(1.73)	(-1.30)	(-3.24)	(4.79)	(0.35)	(2.53)	(-1.59)	(0.28)	(0.18)	.396
																	210
To:	-2.983		-1.876		-.643	-.683	-.034	-.012	.005	.937	-.875	.126	-.158	.439	-.635	.005	.921
	(-6.77)		(-26.97)		(-17.10)	(-0.91)	(-0.05)	(-1.59)	(0.70)	(17.66)	(-7.04)	(2.03)	(-0.29)	(0.83)	(-6.14)	(0.49)	.277
																	210
New Brunswick																	
From:	.091	.763			-1.402	9.794	-7.940	.020	-.022	.187	-.210	.076	.439	-.635	-.882	-.107	.859
	(0.10)	(7.04)			(-18.67)	(9.51)	(-7.29)	(1.60)	(-1.85)	(1.13)	(-2.40)	(0.53)	(0.46)	(-0.56)	(-2.13)	(-1.50)	.237
																	210
To:	-1.877		-1.159		-.893	1.168	-1.378	.003	.006	.601	-.175	.169	-.600	.010	-.803	.013	.924
	(-4.77)		(-16.08)		(-24.35)	(1.74)	(-2.23)	(0.45)	(0.75)	(11.42)	(-1.98)	(2.76)	(-1.00)	(0.02)	(-8.02)	(1.36)	.283
																	210
Quebec																	
From:	2.381				-1.609	9.525	-8.222	.027	.001	-.355	.365	-.120	1.890	-3.210	-.189	.017	.855
	(1.83)				(-31.58)	(12.57)	(-9.32)	(2.28)	(0.07)	(-2.16)	(5.13)	(-0.81)	(2.00)	(-3.13)	(-0.35)	(0.27)	.460
																	211
To:	-4.893	.675			-.491	2.945	-3.812	.012	.009	.622	-.342	.143	1.040	-1.719	-.918	-.010	.891
	(-9.96)	(10.54)			(-12.54)	(4.50)	(-6.14)	(2.12)	(1.40)	(14.51)	(-3.80)	(2.54)	(1.71)	(-3.07)	(-7.43)	(-1.13)	.260
																	210
Ontario																	
From:	-.151				-.745	2.327	-1.994	.027	-.014	-.181	.005	-.165	-2.934	2.539	.445	.036	.582
	(-0.13)				(-14.02)	(3.28)	(-2.32)	(2.55)	(-0.82)	(-1.15)	(0.07)	(-0.80)	(-3.11)	(2.75)	(1.11)	(0.51)	.444
																	211
To:	-1.894	.277	-1.960		-.838	2.810	-2.421	-.011	-.002	.197	-.362	.041	2.037	-2.534	-.824	-.001	.764
	(-2.11)	(3.20)	(-10.34)		(-7.62)	(4.14)	(-3.63)	(-1.19)	(-0.43)	(3.15)	(-4.01)	(0.82)	(4.11)	(-5.07)	(-7.71)	(-0.08)	.230
																	209
Manitoba																	
From:	-.096				-.622	4.193	-5.694	.020	.004	1.045	-.878	.108	-4.728	4.446	.478	.005	.828
	(-0.07)				(-5.44)	(4.79)	(-4.67)	(1.34)	(0.30)	(3.88)	(-5.43)	(0.66)	(-4.12)	(3.94)	(0.96)	(0.04)	.589
																	211
To:	1.465		-1.488		-1.030	-2.100	.224	-.010	-.002	.003	-.031	.441	1.635	-1.563	.506	-.010	.912
	(2.54)		(-17.65)		(-15.88)	(-3.15)	(0.41)	(-1.44)	(-0.32)	(0.03)	(-0.23)	(6.61)	(2.77)	(-2.63)	(4.06)	(-0.97)	.303
																	210
Saskatchewan																	
From:	1.467			-.014	-1.202	4.537	-4.970	.003	-.033	.449	-1.141	.239	-5.323	4.806	1.116	-.021	.907
	(1.49)			(-0.09)	(-14.91)	(4.80)	(-4.17)	(0.18)	(-2.07)	(2.09)	(-7.60)	(1.40)	(-4.25)	(3.82)	(2.47)	(-0.29)	.601
																	210
To:	4.910		-1.544		-1.507	-4.922	2.573	-.005	.003	.071	-.178	.592	1.274	-1.521	1.047	.001	.944
	(7.70)		(-14.73)		(-31.24)	(-5.81)	(3.80)	(-0.62)	(0.34)	(0.72)	(-1.53)	(7.00)	(1.66)	(-1.96)	(5.56)	(0.04)	.370
																	210

Alberta																
From:	-1.003			-.859	3.695	-4.174	.018	.146	.833	-.830	-.105	-5.762	5.116	-9.64	.165	.874
	(-0.69)			(-10.74)	(3.81)	(-3.23)	(1.43)	(1.43)	(4.14)	(-6.53)	(-0.53)	(-4.73)	(4.56)	(-1.86)	(2.56)	.554
																211
To:	4.850	-1.152	-.313	-1.506	2.114	-1.779	-.073	-.010	.073	-.285	.310	2.968	-3.099	.592	.003	.965
	(9.28)	(-16.73)	(-3.35)	(-33.06)	(3.27)	(-3.34)	(-1.69)	(-1.89)	(1.12)	(-3.93)	(4.96)	(5.97)	(-5.46)	(4.81)	(0.40)	.248
																209
British Columbia																
From:	-.217			-.651	3.383	-3.266	.018	-.006	.521	-1.231	.146	-2.464	2.785	.964	.004	.775
	(-0.12)			(-5.00)	(3.03)	(-2.53)	(1.11)	(-0.25)	(1.70)	(-7.57)	(0.76)	(-1.89)	(2.27)	(1.77)	(0.41)	.670
																211
To:	3.415	-.993		-1.620	7.275	-6.967	.003	-.015	-.222	-.366	.230	3.545	-3.846	.011	-.060	.936
	(5.26)	(-11.92)		(-25.93)	(9.06)	(-10.19)	(0.25)	(-2.10)	(-2.97)	(-2.76)	(3.17)	(6.28)	(-6.33)	(0.07)	(-2.57)	.306
																210

SOURCE Estimates by authors.

Unlike Courchene's index, AUI_k/AWW_k is not likely to vary as much in response to aggregate activity. In contrast to UI_k, AUI_k does not increase automatically with the number of people on unemployment insurance. Moreover, AWW_k is not as highly correlated as YL_k with aggregate activity, since it depends to a greater extent on wage rates, as opposed to the number of people employed.

Further discussion of the choice of an unemployment insurance generosity index will be forthcoming in the next chapter.

A Revised Estimating Equation

There remains one final addition to the above discussion of the Todaro/Laber/Chase model. Writing PE_k as:

$$(2.7)\ PE_k = (\Delta E_k/L_k)/(UE_k/L_k),$$

suggests using both $\Delta E_k/L_k$ and UE_k/L_k separately as explanatory variables. This would allow for a possibly unique contribution by each of these two components of PE_k to the potential migrant's expectation with respect to the probability of attaining the average employment income stream in province k. It also provides a clear rationale for the presence in Courchene's equations of the unemployment rates U_j and U_i.[16]

If we now put together all the arguments between equations (2.1) and (2.7), the estimating equation that results is equation V in Table 2-1. In the present context, the most important differences between equation V and the previous equations concern their treatment of transfer income expectations. In equation V, unemployment insurance generosity indexes are included for both origin (*i*) and destination (*j*) provinces, and the generosity index used, AUI_k/AWW_k, differs from that in equations I to IV.

For the same reason that the coefficient on AWW_j is expected to be positive and that on AWW_i negative, we should expect a positive coefficient on AUI_j/AWW_j and a negative coefficient on AUI_i/AWW_i. An increase in unemployment insurance generosity in the destination (origin) will, *ceteris paribus*, improve comprehensive income prospects there and so stimulate (retard) out-migration.

Results of Using the Revised Equation

The resolution of other issues to be raised at the outset of the next chapter will lead us to a model of fiscally induced migration that differs substantially from that embedded in equation V. However, at this point it will be of interest to see if both origin and destination unemployment insurance generosity indexes in equation V perform as expected. For this purpose, we have estimated equation V and certain minor variations on it to be introduced below for Canada as a whole, for each province alone, and for the Atlantic provinces taken together.[17] The latter sample is of particular interest, since the Atlantic region figures so prominently in the equity-efficiency debate reviewed in the first chapter. For brevity in the following discussion of results, a statement that a coefficient is significant means that it is significant at least at the 10 per cent level.

Consider first the results of equation V for Canada as a whole given in Table 2-2. The coefficients on AUI_i/AWW_i and AUI_j/AWW_j are significant, but they are also inverted. It was pointed out that we should expect the coefficient on the origin (*i*) index of

Table 2-4

Estimating Equations for Out-migration from the Atlantic Region, 1951-78

	C	S_1	D_{ij}	YL_j/E_j	YL_i/E_i	AWW_j	AWW_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	U_i	U_j	ED_i	UI_j/YL_j	UI_i/YL_i
V	-3.442 (-4.18)	1.681 (16.10)	-.660 (-7.54)			6.664 (9.61)	-5.130 (-8.32)	.030 (2.98)	-.003 (-0.37)	-.171 (-1.84)	.456 (4.96)	.049 (0.65)		
Va	-6.229 (-6.42)	1.231 (14.77)	-.840 (-10.59)	2.703 (15.76)	-1.771 (-7.55)			.020 (2.55)	.005 (0.77)	.296 (2.53)	.555 (4.95)	.357 (6.09)	-.645 (-7.08)	-.184 (-1.71)
VI	-4.500 (-4.50)	1.542 (14.46)	-.775 (-8.55)			7.076 (9.96)	-6.123 (-8.29)	.026 (2.69)	-.005 (-0.55)	-.147 (-1.30)	.447 (4.77)	-.010 (-0.13)		
VIa	-10.874 (-8.06)	1.264 (15.45)	-.615 (-10.30)	2.649 (14.73)	-.801 (-2.65)			.014 (1.87)	.003 (0.45)	.074 (0.60)	.633 (4.92)	.299 (5.14)	-.697 (-5.51)	-.269 (-2.34)

SOURCE Estimates by authors.

unemployment insurance generosity to be negative and that on the destination (j) index to be positive. But the results for equation V indicate that the opposite is the case.

The results of equation V estimated for each province alone, for both gross out-migration and gross in-migration, are given in Table 2-3. Here the coefficients on the unemployment insurance generosity indexes are of the correct sign in 10 of the 18 equations. In particular, these coefficients are of the expected sign in equations explaining out-migration from an Atlantic province (Newfoundland, Nova Scotia, and New Brunswick) but are "inverted" in equations explaining gross in-migration to an Atlantic province. These coefficients are also of the expected sign in equations for out-migration to provinces west of the Atlantic region.[18]

One possible reason for the variation in results across provinces could be the presence of higher-than-average proportions of return migrants in certain flows. The basic problem here is that return migration may not be adequately explained by the narrowly defined economic variables entering estimating equations like V (Vanderkamp, 1971). Migration to the Atlantic region may be one flow containing a relatively high proportion of return migrants (Gauthier, 1980*b*).[19] So might outflows from the western provinces of Alberta and British Columbia to the rest of Canada. Together these migration flows comprise five of the eight flows for which the unemployment insurance generosity indexes have coefficients with inverted signs.

Table 2-4 presents the results of equation V for out-migration from the Atlantic region as a whole. The unemployment insurance generosity indexes worked well for out-migration from each Atlantic province taken alone in Table 2-3, and they also work well for the Atlantic provinces taken together. The origin coefficient on AUI/AWW is significantly negative and that on the destination index is significantly positive.

This table also shows that AUI/AWW performs better than Courchene's index UI/YL in an equation like V in explaining out-migration from the Atlantic region. Equation Va in Table 2-4 uses the latter unemployment insurance generosity proxy for both origin and destination (YL/E also appears in Va, since this is consistent with the use of YL to deflate total unemployment insurance payments). In equation Va, UI_i/YL_i has the expected negative sign, but UI_j/YL_j also has a negative and significant sign, while AUI_j/AWW_j in equation V has the expected positive and significant coefficient.[20]

We should also note that the results of equation V given in Table 2-4 indicate clearly the expected effects with respect to other federal transfers and grants. Both these fiscal variables are shown to have significantly retarded out-migration from the Atlantic region over the 1951-78 period.

The 1971 Unemployment Insurance Legislation

Equation V can be easily adapted to consider the impact on migration of the 1971 revision in the Unemployment Insurance Act.[21] This legislation, among other things, increased the maximum number of weeks for which unemployment insurance benefits could be drawn in labour market regions with unemployment rates above the national average.

Since the post-1971 increase in the maximum weeks of benefits did not affect AUI, the coefficients

AUI_j/AWW_j	AUI_i/AWW_i	$TRF2_i/YL_i$	GU_i/N_i	$(UI_i/YL_i).T3$	$(UI_j/YL_j).T3$	$(AUI_j/AWW_j).T3$	$(AUI_i/AWW_i).T3$	$(TRF2_i/YL_i).T2$	$(GU_i/N_i).T2$	$\bar{R}^2$ S.E.E. D.F.
1.651 (2.21)	-2.313 (-2.67)	-.593 (-2.02)	-.180 (-3.67)							.822 .565 490
		.291 (1.24)	-.245 (-7.32)							.889 .446 490
-.142 (-0.18)	-2.057 (-2.13)	-.597 (-1.94)	-.135 (-2.63)			3.922 (3.98)	-4.959 (-4.97)	.040 (0.58)	.170 (0.87)	.834 .549 486
		.017 (0.07)	-.194 (-5.50)	-.207 (-2.24)	.126 (0.98)			.188 (3.52)	-.628 (-4.52)	.898 .430 486

on the origin and destination unemployment insurance variables should be expected to shift after 1971. The coefficient on AUI_i/AWW_i should become more negative after 1971 since, *ceteris paribus*, a more lengthy schedule of unemployment insurance payments in the origin will reduce the net present value of a migration decision for some individuals. Analogously a *ceteris paribus* increase in the benefit pay-out period in the destination should increase the net present value of out-migration from province *i* to province *j*.

In order to capture the expected shifts in the coefficients of the unemployment insurance generosity indexes, two terms have been added to equation V of the sort $(AUI_k/AWW_k) \cdot T3$. Here $T3$ is a shift dummy variable that steps in 1972. This yields equation VI in Table 2-1, which, in addition to the two terms just mentioned, also includes the other fiscal variables in equation V entered multiplicatively with another shift variable $T2$, with the midpoint of the 1951-78 period arbitrarily chosen as the shift point.[22]

The results of equation VI for out-migration from the Atlantic provinces as a group are given in Table 2-4. The unemployment insurance generosity indexes themselves as well as the shifts in the coefficients on these indexes generally have the expected signs. The exception is for the coefficient on AUI_j/AWW_j in the destination, but this coefficient is insignificant. All other unemployment insurance generosity indexes exhibit coefficients that are significant. Parenthetically, note that the use of UI/YL as the generosity index in equation VI*a* yields a negative and significant coefficient for both UI_j/YL_j and the corresponding shift variable $(UI_j/YL_j) \cdot T3$.

The results of estimating equation VI for Canada as a whole are given in Table 2-2. The destination unemployment insurance generosity index has a negative and significant coefficient, contrary to our expectations. But the unemployment insurance shift variables are of the expected signs, with that in the origin also being significant.

Differential Fiscal Structure Matters

We began this chapter with a re-estimation using revised data of selected equations from Courchene's stimulating and innovative 1970 paper on fiscally induced interprovincial migration. Disappointing results with respect to the migration impact of unemployment insurance led us to consider the question of how the unemployment insurance system should be represented in a migration equation, and a variation on Courchene's equations was developed in response. At least with respect to out-migration from the Atlantic region, the results of estimating the revised equation confirm Courchene's 1970 conclusion that the unemployment insurance system has retarded interprovincial migration. These results also indicate that the 1971 unemployment insurance legislation, which introduced regional variation in the benefit pay-out period, resulted in a discreet jump in this retarding influence.

However, a central feature of the model of the migration impact of unemployment insurance developed in this chapter is that differential fiscal structure matters. For essentially the same reason that potential migrants compare employment income prospects in their current location with employment income prospects elsewhere, they will also consider transfer income prospects if unemployed in both origin and destination provinces. The results of estimating the revised equation confirm that a *ceteris paribus* increase in the generosity of the unemployment insurance system in the destination province does increase out-migration from the Atlantic region. (Whether the origin or destination effects dominate is a question that will be considered in Chapter 5.)

There is of course no reason to consider differential fiscal structure of importance only with respect to unemployment insurance, as we have noted above. In the next chapter, we shall reconsider the role of all aspects of fiscal structure accordingly, in addition to dealing with several other issues relevant to the modelling of fiscally induced migration that have not yet been raised.

3 Differential Fiscal Structure in a Multinomial Logit Model

Important Problems in the Modelling of Fiscally Induced Migration

We argued in the previous chapter that the equations in Table 2-1 do not adequately represent fiscal structure in the migration context because they do not incorporate differential fiscal structure. The same reasoning that leads to the inclusion of gross-of-tax employment income differentials in Courchene's equations I and II does not permit the exclusion of provincial tax, transfer, and public service benefit differentials (somehow defined) from the same migration equations. We made this point in Chapter 2 most carefully with respect to unemployment insurance benefits but, as we noted in that chapter, it applies equally well to all public sector variables that might influence migration behaviour.

Another problem with the representation of fiscal structure in the equations of Chapter 2 concerns federal unconditional grants. It is clear from the review of the policy issues in Chapter 1 that research on the migration impact of unconditional grants would be of considerable interest. But, since individuals care in the first instance about their net fiscal benefit from government purchases, taxes, and transfers, there is the question of how unconditional grants to provinces should be put into an equation explaining the migration behaviour of individuals, if at all.

There is also an issue simply not addressed by the fiscal structure embedded in the equations in Table 2-1, which, in the light of the discussion in Chapter 1, seems to be important in current debates, and no doubt Professor Courchene would treat it if he were to do empirical work in this area again. Obviously the possibility of migration induced by provincial natural resource revenues from oil and gas is of interest, and this in turn raises the associated and difficult capitalization issue that has been the focus of empirical research on the Tiebout process.

Apart from the question of how to model fiscal structure in the migration context, there are a number of problems associated with estimating migration equations using family allowance migration data that were not acknowledged in Chapter 2. Since the importance to individuals of fiscal structure may vary systematically with income class (see, for example, Gillespie, 1980), disaggregation of migration flows and explanatory variables by income class would obviously be relevant in the present context. The family allowance data do not permit such disaggregation. Moreover, migration responses to a given fiscal structure may vary with age (as, for example, in Schwartz, 1976), occupation (see Stone, 1979), or other socio-economic characteristics, and it is difficult to allow for this when using the family allowance migration series. Finally, using the family allowance data to measure interprovincial migration forces the use of explanatory variables based on province-wide aggregates, rather than on the history of migrants receiving family allowance.

The equations in Table 2-1 may also be criticized for their econometric treatment of migration behaviour *per se*, in at least two ways. First, such equations imply that migration between province *i* and province *j* is independent of conditions in other provinces *k* or *l*, since explanatory variables in these equations pertain only to province *i* or province *j*. This is unrealistic, since an increase in income prospects in province *j* should imply that fewer people move to provinces *k* and *l*. In the equations of Chapter 2, the implication is that increased migration from province *i* to province *j* is entirely at the expense of stayers in province *i* (Grant and Vanderkamp, 1976, pp. 34-35). A second econometric problem concerns the treatment of the "all or nothing" or "quantal choice" characteristic of the migration decision. An individual either moves or not, and McFadden (1973) has argued that it is necessary to take this explicitly into account, since the econometric implications of doing so differ substantially from the conventional specification based on the assumption that a migration decision is perfectly divisible.

The purpose of this chapter is to construct an econometric model of fiscally induced migration that will be more robust with respect to the problems outlined above than are the equations in Table 2-1. We intend to do this by blending fiscal determinants of migration into a multinomial logit model in a particular way, in order to derive a migration equation that can be estimated using migration data that are disaggregated by income class.

We begin by introducing the multinomial logit model in a migration context.

The Multinomial Logit Model in a Migration Context

It is well known that the econometric issues raised earlier can be treated through the use of the multinomial logit (MNL) model (see, for example, Theil, 1969, 1970; McFadden, 1973; and Domencich and McFadden, 1975).

The MNL model has been applied primarily to the study of travel mode choices but, as Moss (1979) has noted, it is well-suited to the modelling of migration behaviour as well. Empirically the MNL model applied to migration behaviour seems to work well in the Canadian context (Grant and Vanderkamp, 1976, and Macerollo, 1980).

Since this model has been extensively considered elsewhere, we shall only sketch the derivation of MNL estimating equations in the present migration context, following primarily Domencich and McFadden.

To begin, let $U(z_j, s, \epsilon)$ denote the utility of an individual with socio-economic characteristics vector s, who chooses between mutually exclusive and discrete alternative destinations $j = 1, \ldots, J$, with attributes vector z_j. The vector ϵ represents all the unobserved attributes of the alternatives and characteristics of the individual that we are unable to measure.

This individual will be assumed to move to destination j from origin i if this destination is the one that maximizes his utility, that is, if:

$$(3.1)\quad U(z_j, s, \epsilon) > U(z_i, s, \epsilon),\ j = 1, \ldots, J \text{ and } j \neq i.$$

Or in other words, it is assumed that each person performs the following calculation (Rothenberg, 1977, pp. 185-86): at each point in time, he perceives that a choice of moving or staying must be made. Each potential destination and his current location is perceived as possessing a set of opportunities and constraints (i.e., a set of attributes) relevant to the calculation; in addition, a set of costs would be incurred (which can be included in the list of attributes of each potential destination). By evaluating each of the alternative destinations in utility terms, the subject forms a utility level for each. If a move to any region yields an expected utility greater than that associated with remaining in the current region, the subject will become a migrant; he will migrate to the region that promises the highest utility.

If we now consider sampling randomly from a population with common socio-economic characteristics s and the same alternatives, the vector ϵ will be random and, as a consequence, the values of the utility function "selected" will be stochastic. Thus the event (equation (3.1)) will occur with some probability P_{ij}:

$$(3.2)\quad P_{ij} = P[U(z_j, s, \epsilon) > U(z_i, s, \epsilon)],\ j = 1, \ldots, J \text{ and } j \neq i.$$

Further, it can be assumed that the utility function U can be written as the sum of a nonstochastic component $V(z_k, s)$ for any alternative jurisdiction k, reflecting the "representative" tastes of the population with socio-economic characteristics s, and a stochastic component $\eta(z_k, s, \epsilon)$, with mean independent of z_k, that reflects the idiosyncrasies of each individual regarding the various choices. Hence for any alternative k:

$$(3.3)\quad U(z_k, s, \epsilon) = V(z_k, s) + \eta(z_k, s, \epsilon),\ k = 1, \ldots, J.$$

This means that equation (3.2) can be written as:

$$(3.4)\quad P_{ij} = P[\eta_i - \eta_j < V_j - V_i],\qquad j = 1, \ldots, J \text{ and } j \neq i,$$

where $\eta_j = \eta(z_j, s, \epsilon)$, $V_j = V(z_j, s)$, and so on.

The probability of staying P_{ii} is given by $1 - \sum_{j \neq i}^{J} P_{ij}$.

In order to derive an estimating equation from equation (3.4), it is necessary to specify the joint probability distribution of the η_k. If the η_k are independently and identically distributed with the Weibull distribution,[1] then (McFadden, 1973) it can be shown that:[2]

$$(3.5)\quad P_{ij} = \frac{e^{V_j}}{\sum_{j=1}^{J} e^{V_j}}, \qquad j = 1, \ldots, J.$$

Domencich and McFadden argue that the Weibull assumption is the only one that leads to a computationally tractable estimating equation.[3]

If the V_k's are log-linear in parameters, as we shall assume (following Grant and Vanderkamp, 1976), since this is consistent with risk-aversion, equation (3.5) is just the usual MNL model. However, the preceding derivation of this model from utility maximization considerations by McFadden (1973) is new, and gives additional support to a choice of the MNL model as a basis for a migration equation.

From equation (3.5), it can be seen that the probabilities sum to one for each i, and that P_{ij} is not independent of the attributes of alternative jurisdictions k, $k \neq i$ and $k \neq j$, since an increase in V_k, due for example to an increase in expected income there, will increase the denominator of equation (3.5) and hence reduce P_{ij}. The MNL model, then, in this respect meets the criticism raised at the beginning of the chapter.

However, while P_{ij} is not independent of the attributes of alternative jurisdictions k, the ratio of any two probabilities, say P_{ij}/P_{ii}, is independent of z_k for all $k \neq i$ and $k \neq j$. To see this, we use equation (3.5) to compute the odds of moving to region j rather than staying in region i, which are:

$$(3.6)\quad \frac{P_{ij}}{P_{ii}} = \frac{e^{V_j}}{e^{V_i}}.$$

This property of the probabilities in equation (3.5) is called "independence from irrelevant alternatives."[4] Note that in equation (3.6) we have normalized without loss of generality by the staying probability, since this seems natural in the present migration context and because it proves to be econometrically most convenient when it comes time to choose an efficient estimator.

Taking natural logs on both sides of equation (3.6) gives:

$$(3.7)\quad \log\left(\frac{P_{ij}}{P_{ii}}\right) = V_j - V_i, \qquad j = 1, \ldots, J \text{ and } j \neq i.$$

This equation provides a good basis for the nonstochastic part of the estimating equation that we seek. In particular, equation (3.7) is convenient because only attributes of origin i and destination j, along with socio-economic variables s, appear on the right-hand side as explanatory variables. V's for provinces other than i or j do not appear in equation (3.7), although they do appear in equation (3.5) for P_{ij}.

The simple form of the right-hand side of equation (3.7) is a consequence of the independence from irrelevant alternatives property. While this property is obviously econometrically most desirable, it does have the drawback that its reasonableness depends on all alternatives being distinct and independent in the eyes of the decision maker (see, for example, Domencich and McFadden, 1975, pp. 77-78). This requirement does not seem too strong in the present situation in which individuals choose between alternative provinces, each of which can be described by its own distinct vector of attributes.

The remainder of the chapter is concerned with the detailed specification of the right-hand side of equation (3.7), and particularly with the specification of the z_k's in $V(z_k, s)$ which can be thought of as consisting of a vector of "private sector" variables x_k (including the costs of moving when $k \neq i$) and a vector of public sector variables w_k.

We turn first to a consideration of the private sector variables.

Private Sector Explanatory Variables

To specify the private sector components of z_k, we rely on the human capital approach to migration as presented in Chapter 2, though the specification of x_k will differ in some respects from the vector of private sector explanatory variables introduced there.

Thus the vector x_k includes a measure of expected real permanent employment income, denoted Y_k. The construction of Y_k from tax data files will be discussed later. The use of an employment income variable reflects the assumption that variation in private nonemployment income (for example, investment or rental income) will not affect the typical location decision.

The vector x_k may include variables reflecting the uncertainty of employment: the growth of employment (both private and public) per person in the labour force $\Delta E_k/L_k$, and the unemployment rate U_k

relative to the national average unemployment rate $\bar{U}$. Note that E_k includes public employment because Y_k includes public sector wages (no suitable measure of public sector wages by province being available). Note also that, in Chapter 2, U_k appeared alone as an explanatory variable, while here we intend to include it only after normalization by $\bar{U}$. The reason for this is that the results in Table 2-3 of Chapter 2 indicate that U_k does not always perform as expected, at times having a positive coefficient in the destination and/or a negative coefficient in the origin. We have decided to use instead $U_k/\bar{U}$, which is a rough measure of structural unemployment in province k. This complements $\Delta E_k/L_k$, which varies cyclically.

We say that the vector x_k *may* include $\Delta E_k/L_k$ and $U_k/\bar{U}$ because we shall also estimate equations that omit both these variables. Recall that the presence of $\Delta E_k/L_k$ and U_k as explanatory variables in Chapter 2 followed from our extension of Todaro's method of proxying expected employment income as the product of a probability of employment and income if employed. We do not reject that model here. We shall still use it to justify including both origin and destination unemployment insurance generosity indices as explanatory variables. However, Y_k as defined later in this chapter encompasses both the probability of employment and income if employed. Thus using Y_k makes $\Delta E_k/L_k$ and $U_k/\bar{U}$ redundant as a proxy for the probability of employment, provided of course that our measure of Y_k captures employment expectations adequately.

Also included in x_k is the distance between major cities D_{ik} (when $k \neq i$) reflecting the costs of moving and other factors influencing mobility, such as the adequacy of information about the destination. And finally, we include the previously defined dummy variables S_1 and S_2 to capture French-language cultural factors in interprovincial migration decisions.

To summarize:

$$(3.8) \quad x_k = (S_1, S_2, Y_k, \Delta E_k/L_k, U_k/\bar{U}, D_{ik} \text{ (if } k \neq i\text{)}).$$

As noted earlier, we will assume that $V(x_k)$ is log-linear.

Denoting the elements in equation (3.8) as "private sector" variables suggests that they are independent of government activity. But strictly speaking this is not in fact true, even if we ignore the fact that Y_k and E_k have a public sector component. Provincial governments, for example, may subsidize firms operating in the province, thereby increasing current values of Y_k and $\Delta E_k/L_k$, and as a result, indirectly attracting migrants. These migrants could reasonably be labelled fiscally induced. We shall have more to say about such indirect effects of fiscal structure on migration decisions later. However, by and large in this study, we will be concerned with the strength of the direct effects of fiscal structure on migration decisions, as these effects are modelled below. For this reason, therefore, our conclusions regarding the extent of fiscally induced migration (in Chapters 4, 5, and 6) should be considered as providing a lower bound to the influence of fiscal structure on interprovincial migration in Canada.

Public Sector Explanatory Variables

The specification of the public sector variables w_k is probably the single most difficult problem in any study of fiscally induced migration. We begin this task with some brief comments on the "Tiebout" literature, since this literature has been immediately concerned with the relationship between differential fiscal structure and migration behaviour.

Why People Move in the Tiebout Class of Models: Scale, Mix, and Incidence Effects

The theoretical debate that followed the original article by Tiebout (1956) generally has been concerned with the necessary and sufficient conditions for migration in response to differences in net fiscal benefits across jurisdictions (often referred to as "voting with the feet") to result in either a Pareto-efficient or a Lindahl equilibrium, and thus to solve the public goods problem first posed by Samuelson (1954).[5,6]

The complementary empirical literature, which is of immediate interest for purposes of this study, has been largely concerned with estimating the inverse relationship across jurisdictions and over time between property taxes and property values, which, it has been argued following Oates (1969), is a by-product of the Tiebout migration process.[7] In the simplest version of this view (assuming costless migration and an inelastic supply of housing), relatively low property taxes in locality *j* relative to locality *i* would (given the same level of public services in both localities) induce migration from locality *i* to locality *j* until property values in locality *j* had risen by an amount equal to the capitalized value of the difference in property taxes between the two locations. In more sophisticated models of voting with the feet, capitalization occurs with respect to public service as well as tax differentials between jurisdictions.

In an important addition to the empirical Tiebout literature, Meadows (1976) usefully classifies the effects of changes in fiscal structure on property values into two types: scale effects and mix effects. Scale effects result from a change in the per capita level of public services, transfers, or taxes, keeping the composition of public services fixed. Mix effects result from a change in this composition (such as an increase in educational expenditures at the expense of public transit) with per capita scale held constant. Scale effects have largely preoccupied the empirical literature referred to above. But, as Meadows notes, Tiebout also argued that the mix of public services would motivate voting with the feet as well.

Meadow's taxonomy is not complete, however. Meadows did not consider what we shall call incidence effects. Keeping per capita scale and mix constant, incidence effects are those that result from a change in the distribution of total net public benefits across individuals.[8]

In the present migration context, pure scale effects would refer to migration from region *i* to region *j* in response to differences in the scale of public benefits or taxes (the per capita level of aggregate public services, taxes, or transfers) given that the incidence and mix of net public benefits are the same in both the origin and destination regions. Pure incidence effects refer to migration from region *i* to region *j* because the fiscal incidence to the individual migrant is sufficiently more favourable in the destination than in the origin, though aggregate public benefits and their mix are the same in both places. And pure mix effects involve migration in response to regional differences in the composition of public services, given that scale and incidence are the same across regions. Of course, all three effects should be expected to have occurred simultaneously in our sample data.

It turns out that, by appropriately defining w_k and V, the choice model given by equation (3.7) can be considered to be consistent with the simultaneous existence of these three types of relationships between migration and fiscal structure.

Defining Net Fiscal Benefits

Defining the public sector variables w_k and the form of the utility function V together amounts to proxying the net fiscal benefit expected by a representative individual in jurisdiction k with given socio-economic characteristics. The fact that we must proxy $V(w_k)$ rather than measure it directly is, to put it mildly, the source of some difficulty. Ideally we would like to have origin and destination values of $V(w_k)$ for each migrant, or at least measures of w_k for each migrant. Failing this, direct measurement of the components of w_k by province and by income class would be desirable, and this is available for 1969 (Gillespie, 1980). But we want to use time series data, and the measurement of fiscal variables by province and income class for each of the years in our sample is clearly beyond the scope of this study. The most disaggregated time series on fiscal variables such as government purchases or transfers that presently exist are the province-wide aggregates in the *Provincial Economic Accounts* published by Statistics Canada. In view of this lack of data, therefore, it is necessary to search for reasonable assumptions that allow us to proxy the $V(w_k)$'s, and which at the same time make the best use of the data available to us on w_k. In this section, we present the results of our search in that respect.

Immediately following this section, we will consider the role of the vector of socio-economic characteristics s in equation (3.3), which has until now been neglected. The treatment of s and the proxying of $V(w_k)$ will turn out to be closely related.[9]

To specify the w_k, we first determine the actual total (federal plus provincial plus local) per capita values of purchases G_k, taxes TX_k, and transfers TR_k made on behalf of all residents in any province k. (A detailed discussion of the definition of these variables will be given at a later stage.) We then allocate purchases, taxes, and transfers to the representative individual in a given income class in province k by assuming that this individual's objective share of these public sector variables can be considered proportional to G_k, TX_k, and TR_k, that is, equal to $\theta_{k1}G_k$, $\theta_{k2}TX_k$, and $\theta_{k3}TR_k$, respectively.[10] Hence we have:

$$(3.9)\quad w_k = (\theta_{k1}G_k, \theta_{k2}TX_k, \theta_{k3}TR_k),$$

where the θ_k's are assumed to vary across income classes.

It is of interest to note that in the case of government purchases, the $\theta_{k1}G_k$ formulation is consistent with the method of apportioning total available government purchases to individuals developed by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973). If all public services are pure public goods, θ_{k1} would equal provincial population N_k; hence, the representative person in any income class benefits from the same level of public services, and this level is equal to the total available to all individuals in the province, $N_k \cdot G_k$. On the other hand, if G_k is a pure private good equally shared, $\theta_{k1} = 1$, and each person in every income class benefits from the (same) per capita level of services G_k.[11]

Disaggregation by income class has been introduced via equation (3.9) because there is a presumption, noted earlier, that the influence of aggregate fiscal structure on migration decisions will vary systematically with income classes. This could be the result of a relationship between individuals and the fiscal aggregates *G*, *TX*, or *TR* that varies systematically by income class. Or it could result from variations across income classes in the migration response to the same change in individual net fiscal benefits. The results of several studies done in the United States on fiscally induced migration, by Bradford and Kelejian (1973), Reschovsky (1979), and Ellison (1980), reinforce the view that disaggregation of migration flows by income class is desirable. These studies found that individuals in different income classes did not respond in the same way to variation in any given fiscal aggregate.

The form of equation (3.9) also allows a rough treatment of the exporting and importing of provincial taxes and public services across provincial boundaries. According to McClure (1964, 1967), as applied in the Canadian context, taxes may be rearranged spatially in three ways: they may be passed to other provinces via federal-provincial fiscal arrangements; they may be shifted to out-of-province residents through the increase in the prices of interprovincially traded, taxed commodities or via interprovincial migration of factors; and, finally, some taxes may fall on nonresident owners of factors. Likewise we should add that spillovers across provincial boundaries may exist in the provision of provincial public services, and this should in principle be allowed for in measuring net fiscal benefits by province. Indeed, such spillovers have played a central role in the economic theory of the optimal federal structure, as in Breton (1965, 1970) and Williams (1966).

Spillovers can be regarded as creating a divergence between measures of *G*, *TX*, and *TR* for a given province and the values of these variables, which are relevant to the computation of an individual's net fiscal benefit in that province. If we let this divergence in province *k* be proportional to G_k, TX_k, and TR_k, with the factors of proportionality varying across public sector variables, then the θ_k's in equation (3.9) can absorb this divergence, if it exists.

While this appears to be the only assumption that allows this issue to be treated in the context of the model developed here, it is a strong assumption in the case of tax imports and benefit spill-ins. This is because the assumption implies that imports and spill-ins into province *k* are related to *G*, *TX*, and *TR* in province *k*, rather than to the values of these variables in the province in which the taxes or spill-ins originate.

In order to allow pooling of data across destinations *j*, it must be assumed that, for each income class, for each origin *i*, and for each component α of equation (3.9):

$$(3.10)\quad \theta_{j\alpha} = \theta_{k\alpha}, \qquad j, k = 1, \ldots, J \text{ and } j, k \neq i.$$

In other words, we assume that an individual in a given income class believes that his share of any fiscal aggregate will be constant across all possible destinations.

We further assume that the expected utility value of each component of w_k to the representative individual in a given income class in province *k* is proportional to the log of that component. Hence, ignoring x_k and subsuming the θ's into the parameter a_{k0}, we have:

$$(3.11)\quad V(w_k) = a_{k0} + a_{k1} \log G_k + a_{k2} \log TX_k + a_{k3} \log TR_k, \qquad k = 1, \ldots, J.$$

The a_k's can also be thought of as reflecting, in part, the expected value to an individual in a given income class of the mix of public services, taxes, or transfers embedded in the per capita values of *G*, *TX*, and *TR*. A more desirable mix for a given income class will yield a higher value of the corresponding *a*. The *a*'s may vary across income classes. They will also tend to differ from each other, for a given income class, since the same dollar of purchases, taxes, and transfers is received or paid under different public programs with different restrictions attached.

To allow for pooling of data across destinations, it must again be assumed as in equation (3.10) that for each origin *i*:

$$(3.12)\quad a_{j\alpha} = a_{k\alpha}, \qquad j, k = 1, \ldots, J \text{ and } j, k \neq i.$$

We would also like to assume that for each origin *i* and any given component α of equation (3.9):

$$(3.13)\quad a_{i\alpha} \neq a_{j\alpha}, \qquad j = 1, \ldots, J \text{ and } j \neq i.$$

This would allow for the staying choice to be differently affected by its attributes than the destination choice. Equation (3.13) allows, for example, for the influence of unemployment insurance on the ability to finance a move out of province *i*, a factor which plays no role in assessing the value of unemployment insurance to the migrant in the destination. However, multicollinearity problems to be acknowledged in the next chapter will permit this assumption only for selected components of w_k (including the unemployment insurance generosity indices).

The specification of public sector benefits in equations (3.9) to (3.13) is consistent with the existence of scale, mix, and incidence effects, as defined earlier. This of course was the purpose of the intervening developments of the choice model in equation (3.7). To see this, consider first a situation in which, say, G_j is larger than G_i for some alternative destination j and origin i. The scale of G_j relative to G_i tends to make V_j larger relative to V_i, all other things in equation (3.11) held constant. This makes the odds of moving in equation (3.7) larger. Similarly, if the incidence of public services in destination j is more favourable for the representative individual in a given income class than it is in origin i (assuming equation (3.13) applies), all other things in equation (3.11) held constant, a_{j1} will be greater than a_{i1}. This implies V_j is large relative to V_i, and hence that P_{ij} is larger relative to P_{ii} than it would be otherwise. Analogously, if the mix is more desirable in destination j than in origin i, a_{j1} will tend to be greater than a_{i1}, which, *ceteris paribus*, increases the odds that a move from region i to region j will be made.

However, note that, while the specification of net public sector benefits adopted is consistent with the existence of scale, mix, and incidence effects, it will not permit identification of the contribution of each effect separately. Moreover, while the above formulation allows scale to vary over time, as well as across provinces and income classes, incidence and mix can vary only across provinces and/or income classes, because these effects are embedded in the coefficients a_k of equation (3.11).

Summarizing, the model that has been constructed so far can be displayed by substituting subsequent developments into equation (3.7). This yields (ignoring the dummies S_1 and S_2) for a given income class:

$$
\begin{aligned}
(3.14)\quad \log\left(\frac{P_{ij}}{P_{ii}}\right) &= V(x_j, w_j) - V(x_i, w_i) \\
&= \alpha_0 + [\alpha_1 \log Y_j + \alpha_2 \log Y_i \\
&\quad + \alpha_3 \log(\Delta E_j/L_j) \\
&\quad + \alpha_4 \log(\Delta E_i/L_i) + \alpha_5 \log(U_j/\bar{U}) \\
&\quad + \alpha_6 \log(U_i/\bar{U}) + \alpha_7 \log D_{ij}] \\
&\quad + [\alpha_8 \log G_j + \alpha_9 \log G_i \\
&\quad + \alpha_{10} \log TX_j + \alpha_{11} \log TX_i \\
&\quad + \alpha_{12} \log TR_j + \alpha_{13} \log TR_i], \\
&\qquad j = 1, \ldots, J \text{ and } j \neq i
\end{aligned}
$$

where, as usual, j refers to the destination and i to the origin.

The Treatment of Socio-economic Characteristics

Equation (3.14) does not contain any elements of the vector of socio-economic characteristics s, that appeared in the original definition of the V_k's in equation (3.3). However, it turns out fortuitously that applying equation (3.14) to each income class of migrants separately is probably the best way of dealing with the presence of socio-economic characteristics in equation (3.3) other than those proxied by S_1 and S_2.

As Stopher and Meyburg (1976, Chapter 1) note, the form of equation (3.7) implies that the components of s do not enter linear-additively unless they are assumed to have choice-dependent coefficients. If so, this would rapidly escalate the number of terms on the right-hand side of equation (3.14). Entering the components of s interactively with the other variables is also ill-advised, because it can result in multicollinearity, and it also increases rapidly the number of coefficients to be estimated. Stopher and Meyburg recommend using the socio-economic characteristics to aggregate the population into relatively homogeneous subgroups, and that is the approach embodied in principle in equation (3.14). However, an important limitation of this approach as it will be applied here is that primary reliance will be placed on a particular definition of income class as the basis for disaggregation. The tax data available to us, described more fully below and in Appendix C, permit disaggregation by many other socio-economic characteristics as well and, to some extent, this will be done.[12] But extensive disaggregation rapidly pushes us past a confidentiality requirement attached to the use of this data. More about this later.

Our final estimating equations will retain those socio-economic variables S_1 and S_2 from Chapter 2 that account for the role of French language and culture in out-migration from the Atlantic region, and in particular from New Brunswick to Quebec (S_1), as well as for their role in out-migration from Quebec (S_2). Grouping data by income class will not alone be adequate to capture the importance of these particular socio-economic variables to interprovincial migration decisions in Canada.

Comparison with Courchene-type Equations and the Role of Intergovernmental Grants

A comparison of equation (3.14) with the type of equation used in Chapter 2, in the light of the remarks with which we began this chapter, reveals two important differences.

First, fiscal variables appear for both origin and destination, as do the private sector variables; that is, it is differential fiscal structure that matters. Courchene's equations I and II in Table 2-1 contained fiscal variables for the origin province only. Secondly, intergovernmental grants such as *GU* in equation III of Table 2-1 do not appear here. In the present model, individuals get utility directly from net fiscal benefits, and it is these net benefits in the origin and destination that directly influence migration decisions. Of course, intergovernmental grants will alter a province's budget restraint, and hence, via provincial government behaviour, may influence *G*, *TX*, and *TR*.

However, in view of the issues outlined in Chapter 1, it is clearly desirable that we look explicitly at the influence of federal unconditional grants on migration behaviour. To do this, we must first follow Winer (1981), Slack (1980), McGuire (1978), and others in writing an equation like the following:

$$(3.15)\quad \begin{bmatrix} GP_k \\ TXP_k \\ TRP_k \end{bmatrix} = f(Y_k, GU_k, NRR_k),$$

where Y_k is a proxy for the decisive voter's gross income in province *k*, the *P* on the left-hand side refers to a provincial/local jurisdiction, *GU* is per capita unconditional grants, and *NRR* denotes other predetermined net revenue resources (excluded from *TXP*) except for the net issue of debt.

The aggregation of provincial and local governments in equation (3.15) is a necessary simplification that allows us to avoid accounting for the possible independence of localities from the corresponding provincial government, and hence allows a reduction in the number of explanatory variables that would otherwise appear in the estimating equations.

Equation (3.15) can be thought of as the reduced form of a decisive-voter model of provincial/local budgetary decisions. In such a model (see, for example, Winer, 1981), the politically successful government maximizes the decisive voter's utility $W_k = W(Y_k', \theta_1 GP_k)$, subject to its (the government's) budget restraint, where the voter's net income Y_k' is equal to gross income Y_k less the voter's share of taxes, $\theta_2 TXP_k$, plus his share of transfers, $\theta_3 TRP_k$. The government's budget restraint can be written as follows:

$$(3.16)\quad GP_k = TXP_k - TRP_k + GU_k + GC_k + NRR_k,$$

where (in addition to previous definitions) *GC* represents conditional grants. In equation (3.16), it is assumed that provincial/local public goods *GP* are produced at constant cost, and defined so that one unit costs one dollar. It is also assumed that *GC* is completely fungible, or equivalently, that the strings attached to the receipt of conditional grants are not binding on the provinces. Net provincial revenue raised via the issue of debt is omitted from equation (3.16) without loss of generality.[13]

If it is further assumed that conditional grants are mainly open-ended, and hence depend on provincial/local expenditures, choosing GP_k, TXP_k, and TRP_k to maximize W_k subject to equation (3.16) yields the reduced-form equations (3.15).

Substitution of equations (3.15) after linearization into equation (3.14) gives, for out-migration from province *i* to province *j*:

$$\begin{aligned}(3.17)\quad \log\left(\frac{P_{ij}}{P_{ii}}\right) = \beta_0 &+ [\beta_1 \log Y_j + \beta_2 \log Y_i \\ &+ \beta_3 \log(\Delta E_j/L_j) \\ &+ \beta_4 \log(\Delta E_i/L_i) \\ &+ \beta_5 \log(U_j/U) + \beta_6 \log(U_i/\bar{U}) \\ &+ \beta_7 \log D_{ij}] + [\beta_8 \log GF_j \\ &+ \beta_9 \log GF_i + \beta_{10} \log TXF_j \\ &+ \beta_{11} \log TXF_i + \beta_{12} \log TRF_j \\ &+ \beta_{13} \log TRF_i + \beta_{14} \log GU_j \\ &+ \beta_{15} \log GU_i + \beta_{16} \log NRR_j \\ &+ \beta_{17} \log NRR_i], \\ &\qquad j = 1, \ldots, J \text{ and } j \neq i.\end{aligned}$$

Here *GF*, *TXF*, and *TRF* refer to the federal components of *G*, *TX*, and *TR*, respectively.

Two important features of equation (3.17) must be noted before moving on to consider how other fiscal variables should be included in this equation. First, in contrast to the equations of Chapter 2, federal unconditional grants appear here for both origin and destination, since differential fiscal structure matters. Secondly, note that the provincial/local components of taxes, transfers, and purchases are not included in equation (3.17). To do so along with intergovernmental grants would be in effect a "double-counting" of the role of the provincial/local fisc, in view of the model of provincial/local budgetary decisions presented above.

The Role of Unemployment Insurance

The purpose of this section is to amend equation (3.17) to allow explicitly for the role of unemployment insurance.

As noted in Chapters 1 and 2, the 1971 changes in the Unemployment Insurance Act provided for the first time that unemployment insurance benefit payout periods be determined partly by regional unemployment levels. In view of the issues raised in Chapter 1, it is of great interest to see if unemployment insurance, and this policy change in particular, had any part to play in explaining why net in-migration to the Atlantic provinces (or for that matter, to Alberta) increased so dramatically in the early 1970s.

There are at least three conceptually distinct ways in which unemployment insurance could influence migration behaviour. First, given that an individual is receiving unemployment benefits, variation across regions in unemployment insurance generosity would tend to induce migration towards areas with relatively more generous benefit schedules, because this would result in a higher level of transfer income. Second, since the work-leisure decision depends in general on the level of transfer or nonemployment income in an individual's current location, a cut (say) in unemployment insurance benefits to an individual may precipitate a search for additional employment income. Interprovincial migration may be part of this search activity. And third, like other components of transfer income, unemployment insurance benefits in the origin are a determinant of an individual's ability to finance a move and therefore of his migration decisions.

An attempt to estimate the strength of the second channel of influence of the unemployment insurance system (via the work-leisure trade-off) was probably what led Professor Courchene to use total unemployment insurance benefits per dollar of labour income in the origin, UI_i/YL_i, as his unemployment insurance variable. But we have already pointed out a serious problem with this variable in Chapter 2, namely, its cyclical sensitivity, which may be responsible for its bad performance in Tables 2-2 to 2-4 including a positive and significant coefficient in some cases.

In Chapter 2, the ratio of average weekly unemployment insurance benefits to average weekly wages, AUI_k/AWW_k, was used in order to measure the generosity of the unemployment insurance system in the origin and destination. This variable seemed to work reasonably well for some provinces and regions. But it has the drawback that its coefficient can be expected to shift at some point in our sample period, because the same average weekly benefits AUI last for longer periods after 1971 in high-unemployment regions. The results of equation VI in Table 2-4 confirmed that the coefficients on AUI/AWW in the origin and destination do indeed shift as expected after the 1971 revisions in the Unemployment Insurance Act.

It is desirable, therefore, to measure the regional generosity in the system more directly by combining the following two structural parameters of the unemployment insurance system. These parameters are primarily responsible (if anything is) for regional variation in unemployment insurance generosity (Riddell, 1980; Gauthier, 1980*a*):

- The ratio of the maximum number of weeks of benefits that a person with the minimum number of weeks of employment required to qualify for unemployment insurance can draw, to the minimum number of weeks required, that is, MAX/MIN. MAX/MIN is essentially constant across regions before 1972, and varies only after the 1971 legislation had introduced regional variation in MAX.
- The degree to which eligibility rules are strictly interpreted and enforced, measured by the ratio of initial claims accepted to initial claims filed, that is, CA/CF. This factor exhibits some variation across regions throughout the entire sample period.

The unemployment insurance generosity index that we shall use is the product of these two parameters:

$$(3.18)\quad UIDEX_k = \frac{MAX_k}{MIN_k} \cdot \frac{CA_k}{CF_k}.$$

The coefficients on $UIDEX_k$ should not be expected to shift after 1971, since this variable is continuous with respect to the regional variation introduced by the 1971 Unemployment Insurance Act. Also, since migration flows will be disaggregated by income class, there is no need to normalize this index by income to take account of the possibility that effective unemployment insurance generosity may vary systematically with the employment income of migrants. If the unemployment insurance system is "worth" more to lower-income individuals, as was suggested in Chapter 2, this will be captured by the coefficients on *UIDEX* and, indeed, we do expect these coefficients to be larger and more significant for low-income than for high-income groups.

Following the extension of the Todaro model developed in the previous chapter, *UIDEX* will be included as an explanatory variable both for the province of origin as well as for the province of destination. As in Chapter 2, we should expect a positive sign on the coefficient of $UIDEX_j$ in the destination, and a negative sign on the origin coefficient. The coefficients on $UIDEX_j$ and $UIDEX_i$ will not be constrained to be equal in our estimating equations. This will permit the coefficient on $UIDEX_i$ in the origin to capture both the influence of unemployment insurance on the ability to finance a move as well as the migration influence of unemployment insurance via its effect on the work-leisure trade-off. Equation (3.17) amended to include $UIDEX_k$ will be stated in the next chapter. We note only at this point that, when $UIDEX_k$ is included in equation (3.17), *TRF* will be redefined as federal transfers to persons, excluding unemployment insurance; that is, *TRF*2 in the notation of Chapter 2.

The Role of Natural Resource Revenues, Capitalization and Cost-of-Living Differentials

While the influence of unemployment insurance may be of particular interest with respect to out-migration from Atlantic Canada, natural resource revenues from oil and gas are of particular interest in the study of migration to Alberta, British Columbia, and, to a lesser extent, Saskatchewan.[14] In this section, the role of natural resource revenues in an equation like (3.17) is considered, as well as the associated treatment of capitalization and cost-of-living differentials.

Presumably, potential migrants to resource rich-provinces might anticipate current or future fiscal benefits from provincial ownership and taxation of a resource that is likely to appreciate at a rate higher than the national average rate of inflation. The question is, what variable(s) would reflect the representative migrant's expectations of future fiscal surpluses flowing from the provincial taxation of natural resources?

In order to deal with this question, it is useful to first consider the migration impact of the capitalization of expected fiscal benefits into housing prices, as well as the analogous influence on migration of regional cost-of-living differentials. In the Tiebout literature cited earlier, fiscally induced migration into a given region will result in capitalization of some part of the net fiscal benefit in that region into the price of housing services, to the extent that these housing services are in inelastic supply.[15] For example, to move into a region where the tax-price per unit of a given quantity of public services is less than the tax-price per unit for the same level of services in his original place of residence, an individual would be willing to bid up the price of houses (the entry fee) by an amount that varies directly with the capitalized value of the additional fiscal surplus from which this individual would benefit by moving into this region.

If capitalization of regional differences in net fiscal benefits does occur, and housing prices in a given destination do rise relative to those in the origin, because the fiscal system is relatively generous in that destination, we should expect fiscally induced migration to be diminished, though not necessarily eliminated.[16] Indeed, any increase for whatever reason in the cost of living in a given destination relative to the place of origin will, *ceteris paribus*, tend to retard migration to that destination, since such a rise in (relative) prices reduces the expected real net return (recall equation (2.1)) from the migration investment.

To capture the effect of cost-of-living differentials on migration from province *i* to province *j*, we shall introduce into equation (3.17) a separate term in the log of the ratio of a price index for province *j* to a price index for province *i*.[17] This term will capture the effect on migration from province *i* to province *j* of any capitalization of net fiscal benefits into housing prices, as well as the effect of any cost-of-living differential that might exist for other reasons. It is not possible to capture the effect of capitalization separately without a measure of how capitalization of fiscal surpluses alone has influenced housing prices, and to our knowledge such a measure does not exist.

The use of a separate term to reflect regional price differences (while deflating all other variables by the national consumer price index), rather than deflation of variables by the appropriate region's price index, reflects our desire to look explicitly at the effect of cost-of-living differences on the migration decision. This follows Renas (1980). The alternative is to deflate all data for each province by the appropriate price index.[18] Using the difference in the log of the regional price indexes as an explanatory variable is convenient, because all other variables also enter in log linear form.

Provincial or even regional price indexes on a interregionally comparable basis are extremely hard to find in Canada, and we shall use as data the only two such indexes that we have been able to acquire. The first is an index of housing prices alone, HP_k, based on the Multiple Listing Services (MLS) total value of listings by province and year. This index, with

1971 = 100 for the Canada total, has a small but unknown amount of nonresidential property included. It may also be cyclically sensitive to some extent, since the number and type of houses listed by the MLS may vary with economic activity. The second index, denoted RP_k, is a measure of the cost of living in province *k*. This index was constructed by adding to the Statistics Canada regional retail sales price index a regionally comparable housing price component (see Wrage, 1978, and Appendix A).

We cannot predict the signs of the coefficents of either log (HP_j/HP_i) or log (RP_j/RP_i). *Ceteris paribus*, equation (2.1) implies that an increase in current prices in province *j* relative to province *i* will reduce the real net present value of a move from province *i* to province *j*. This suggests that the coefficients will be negative. But it is not possible to hold constant in our equations expectations with respect to the future real appreciation or depreciation of houses and other assets. Given a migrant's inability to finance the purchase of a house other than his principal residence, a rise in housing prices in Alberta relative to Ontario, for example, may attract migrants westward if they believe this signals a future real appreciation of a house in Calgary or Edmonton (relative to the same house in Ontario). Such expectations may, for example, reflect a belief that net fiscal benefits financed by provincial resource revenues will increase dramatically in the future, and that these benefits will be capitalized to a considerable extent into future housing prices. However, while the sign of the coefficients on the relative price term is ambiguous for any given income group, it is reasonable to expect this coefficient to be (algebraically) smaller for low than for high income groups. This is because liquidity constraints are likely to be more severe for lower income individuals.

It is appropriate at this point to briefly point out that the possibility of capitalization raises the question of whether the relative price indices and the left-hand side of equation (3.17), the origin/destination-specific gross migration rates, may be simultaneously determined. Capitalization of interprovincial differences in net fiscal benefits occurs, after all, because interprovincial migrants bid up the price of housing. This, however, is probably not a serious problem in the context of equations like (3.17), as shall be argued in the next chapter.

Let us now turn to the choice of a natural resource revenue variable. To reflect the expectation of current and future provincial net public benefits flowing from natural resources revenues that are not capitalized into housing prices, we shall include in equation (3.17) origin and destination terms in log *NRR*. The influence on migration of the capitalization of natural-resource-fueled net public benefits will be included in the coefficient of the regional price differential variable, since we assume regional housing and other prices will change to the extent that such capitalization occurs. *NRR* refers to the real value, using the consumer price index as a deflator, of the sum of provincial indirect taxes from the resource sector (including royalties, sales and leasing of rights, and so on) plus net profits of resource-related provincially owned crown corporations. A measure of direct provincial taxes on profits and dividends originating in the resource sector is not available for inclusion in *NRR*. *NRR* as defined is comparable across provinces, and is available in the Statistics Canada publications listed in Appendix A. Since we are particularly interested in capturing the influence of the rapid increase during the 1970s of provincial oil and gas revenues on migration, *NRR* will be constrained to zero, except for Saskatchewan, Alberta, and British Columbia, the only provinces with any sizable revenues from these sources.

NRR enters equation (3.17) via equations (3.16) and (3.15). That is, *NRR* is considered to be a provincial revenue source that is predetermined in the current period. Strictly speaking, of course, *NRR* is determined in the current period by provincial choices of tax rates and tax bases. However, oil and gas revenues, the variation in which dominates *NRR* in our sample (1968-77) period, depend primarily upon world prices, which are set independently of provincial governments. In this sense, *NRR* can be considered predetermined in the current period. Higher current values of *NRR* will relax the provincial/local budget restraint in equation (3.16), and thus permit either lower current or future provincial/local taxes, or higher current or future levels of service. Hence we should expect the sign of the coefficient on NRR_j in the destination to be positive, and vice versa for NRR_i in the origin.

The size of the coefficient on *NRR* will reflect in part the choice made by provincial governments as to how much of current resource revenues will be saved in the form of Heritage Funds or by accumulating other assets (Scarfe and Powrie, 1980, p. 171), even though such a decision is not explicitly part of the simple model of provincial governments represented by equation (3.15) above. If provincial resource revenues are completely and immediately distributed as they arise, migrants may come in, receive them as fast as they appear, and then leave when they diminish. But if resource-revenue-fueled net public benefits are received by residents as a continuing addition to after-tax income, their present value is high only to those who plan to remain in the province for a long time. In that case, the in-migration of transients is discouraged, and the coefficient on *NRR* would tend to be smaller as a result.

Other Public Sector Variables

We have so far discussed the definition of all public sector variables in equation (3.17), except GF_k and TXF_k. We omit any discussion of the definition of *TXF* here because it will not appear in our final estimating equations, for reasons that will be given in the next chapter.

GF_k is defined as the sum for province *k* of: federal nonwage, nondefence current purchases of goods and services, federal gross capital formation, the corporate part of federal capital assistance (including grants to firms by the Departments of Regional Economic Expansion and Industry, Trade and Commerce), and the agriculture component of federal current subsidies.

We exclude the wage part of federal current purchases because it is already included in Y_k. The defence part of current purchases is excluded because of the way in which it is measured by the *Provincial Economic Accounts* (PEA), from which most of our data on fiscal structure are derived. For example, if the federal government buys a sea patrol aircraft based in one of the Atlantic provinces, then the cost of that aircraft shows up in the PEA as a federal current purchase in that region. This has very little to do with differential fiscal structure in the present migration context. The personal part of federal capital assistance is excluded because it is essentially equally available to all individuals regardless of province of residence. The rationale here is the same as that which we shall use to justify leaving *TXF* out of the final estimating equations. The nonagriculture part of federal current subsidies is excluded from GF_k because it includes the petroleum price subsidy, the provincial distribution of which does not reflect the distribution of the benefits of this program. For example, Ontario is not allocated any of this subsidy, but imported oil is consumed in Ontario.

The Tax Data and the Definition of Expected Income

Our earlier treatment of the private sector explanatory variables in equation (3.17) omitted a detailed discussion of the construction of the expected employment income proxy Y_k. This section provides that discussion.

In order to detail the manner in which Y_k has been constructed, it is necessary to first introduce briefly the tax data upon which Y_k is based. This data is more fully described in Appendix C. From the Statistics Canada 10 per cent federal tax file sample for 1967 to 1977, the following six categories of filers were excluded: filers younger than 20 or older than 55 years of age, international migrants, students, filers with total incomes less than $100, women with "low" incomes, and filers whose major source of income was from investments or rentals. The remaining files were then grouped by income classes and province-of-origin/province-of-destination pairs. Income for this purpose was defined as total income in the destination. The four "income classes" chosen are constant dollar classes using the consumer price index as a deflator. For 1977, these classes are: poor without tax ($100 to $10,000 paying no tax), poor with tax ($100 to $10,000), middle ($10,001 to $20,000), and rich ($20,001 or more).

All this gives a very interesting set of migration flows for the years 1968 to 1977, composed basically of tax filers whose major source of income is from employment (or self-employment), unemployment insurance, or other transfers, and who moved interprovincially during a given year, as measured by a comparison of provinces of residence on December 31. While there is additional information in the data base that would allow disaggregation beyond that outlined above, our ability to make use of such information is limited by strict confidentially requirements, which allow only totals or averages over individual files to be released, and then only when there are at least six files in a cell of any mobility matrix.[19] Even with the few classifications used, there are many such zero or missing cells, especially when the origin is in the Atlantic region. For this reason, the tax data migration flows tend to be more origin/destination-specific than the family allowance data. For example, tax data flows out of the Atlantic provinces are to a greater extent centred on Ontario as the destination than are the family allowance data, since many tax data cells with western provinces as the destination have fewer than six members. The family allowance data is essentially a 100 per cent sample of all families, while the tax data is based on a 10 per cent sample of all tax filers.

Use of the tax data to measure migration flows and some explanatory variables permits us to deal with problems associated with using family allowance data, which were raised at the beginning of this chapter. Estimating equations like (3.17) separately for each income class makes the coefficients of explanatory variables robust with respect to any variation across income classes in the migration response to changes in the per capita provincial fiscal aggregates that must be used to represent fiscal structure. This disaggregation by income class also allows to some extent for a relationship between migration behaviour and socio-economic characteristics, at least to the extent that the latter are correlated with income class.

Another desirable feature of using tax data is that this permits the construction of income proxies that correspond to the migration flows on the left-hand side of the estimating equations. The income variables used in Chapter 2 were simply province-wide aggregates, which bore no direct relationship to the dependent variable in the equations of Table 2-1. However, the tax data allow us to construct a measure of expected employment income Y_k from the history of the same individuals whose migration decisions have resulted in their being included in our (tax data) migration flows. This results in an income variable that performs substantially better than YL_k/E_k or AWW_k does in the equations in Table 2-1. The equations estimated in the next chapter using tax data always exhibit income coefficients of the expected sign. This is so even for those flows, such as migration to the Atlantic region from the rest of Canada, or to Alberta and British Columbia from the rest of Canada, where use of the equations in Chapter 2 usually results in income coefficients with inverted signs.

Constructing a Measure of Expected Employment Income Using Tax Data

Our construction of an expected employment income proxy from the tax data is based on the assumption, as in Golladay and Haveman (1977, p. 35), that the average income of a group defined by aggregating according to socio-economic characteristics thought to determine earnings potential is a good measure of expected permanent income. This method is also analogous to that used by Robinson and Tomes (1980). They employed predicted incomes from a regression of current incomes on a vector of socio-economic characteristics as a measure of expected permanent income. However, while Golladay and Haveman use 177 characteristics, we have been able to use basically eight: income class, province of origin or destination, plus the other six characteristics listed above. Hereafter, when we refer to "income class," we shall mean an income class that has also been defined with respect to all of these characteristics except origin or destination. Use of additional characteristics to define "income class" would press us against the confidentiality limit explained above, so there would be a significant increase in the number of empty cells in our mobility matrices.

Having decided to use an average of incomes within a given income class, there is then the question of which such average best reflects the expectations of migrants. In this respect, there are basically two choices. We could use the actual average income of migrants in a given income class for a given origin/destination pair, that is, the average actual income of movers from province i to province j before the move (in province i) would serve as Y_i, and Y_j would be computed as the average income of the same individuals after the move was completed (in province j). In other words, this choice of definition involves using the actual average income history of movers in each cell of the mobility matrices for a given income class. Or, we could use some average of incomes (or a function of average incomes) other than the actual incomes of migrants.

Grant and Vanderkamp (1976) do not recommend the use of the actual average income of migrants. The use of this measure implies that income expectations are accurate and that the migrant is concerned only with the short-run future. In fact, like Grant and Vanderkamp, we have found that using actual averages for Y_k results in income coefficients that are at times insignificant, and at times "inverted" (that is, the coefficients on Y_i are positive and those on Y_j are negative). Of course, this problem could probably be overcome by the appropriate use of lags. However, such a solution is not desirable here, since our data cover only the 10 years from 1968 to 1977.

We have instead chosen to use a variant on the expected income measure used by Grant and Vanderkamp.[20] Thus the destination expected income variable Y_{jt} is defined as:

$$(3.19)\quad Y_{jt} = \frac{YA_{i,t-1}}{YS_{i,t-1}} \cdot YS_{j,t},$$

where $YA_{i,t-1}$ is the actual average employment income of movers from province i to province j in a given income class in the year before their move; $YS_{i,t-1}$ is the average employment income of stayers in province i in all income classes in year $t-1$ (who did not move from province i during year t); and $YS_{j,t}$ is the average employment income of stayers in province j in all income classes in year t (who did not move from province j during year t).[21] In equation (3.19), all variables are deflated by the national consumer price index for the appropriate year.

This measure can be interpreted in two ways. First, equation (3.19) assumes that the individual migrant from province i to province j expects to receive a permanent employment income in the destination corresponding to his position in the income distribution in the home region, as measured by the ratio of

YA_i to YS_i.[22] This is the interpretation of Grant and Vanderkamp. But Y_{jt} can also be written as:

$$(3.20)\quad Y_{jt} = YA_{i,t-1} \cdot \frac{YS_{j,t}}{YS_{i,t-1}}.$$

It can be seen from equation (3.20) that the definition of Y_{jt} implies that the migrant from province i to province j expects his permanent employment income to increase by the ratio of average employment incomes (over the entire population of stayers) in provinces i and j. For example, this means that someone who moves from Newfoundland to Ontario expects his permanent employment income to increase approximately by the ratio between average permanent employment incomes in Newfoundland and in Ontario.

We define Y_{it} analogously:

$$(3.21)\quad Y_{it} = \frac{YA_{i,t-1}}{YS_{i,t-1}} \cdot YS_{i,t}.$$

Grant and Vanderkamp used the average income of all movers from province i, regardless of destination or income class, as the proxy for expected employment income at the place of origin.[23]

The use of $YS_{k,t}$ in equations (3.19) to (3.21), where t denotes the year in which a move is actually made, implies a forecast of up to one year ahead by the migrant in the computation of long-run expected employment income and, on average, a forecast of one-half year ahead. For example, assume a person in a given income class moves from province i to province j during 1968, as indicated by the difference in his place of residence on December 31, 1967, and December 31, 1968. Using an average of incomes of stayers in province i over the year 1968 to compute a measure of expected foregone income of this person who moved on, say, January 1, 1968, implies a forecast of one year ahead by him of what his permanent income would have been had he stayed in province i. Similarly, use of the average income of stayers in province j in 1968 implies a forecast of one year ahead by the migrant of what he expects his permanent income to be in province j.

Finally, it is important to note that, as defined here, expected employment income probably does not adequately reflect the expectation of future employment opportunity or employment income to be generated by any government's fiscal activity. This is because Y, as defined above, does not incorporate the effect of such fiscal activity on future average employment income in any region. Rather, it has been assumed that a migrant expects his income to change by an amount that depends on the ratio of the current average employment income in the destination to that in the origin. Thus the coefficients on fiscal variables may reflect migration motivated by expectations of future, publicly financed, employment opportunities, as well as reflecting the expectation of fiscal benefits to be received directly through the corresponding fiscal systems.

A Comment on International Migration

Before turning to the estimation of the model developed in this chapter, we consider briefly in this section the relationship between international and internal migration.

There has not been any reference to international migration in the development of the model so far. But clearly an influx of international migrants to Alberta, for example, would reduce the likelihood of migration to Alberta from other provinces. This is so because international immigrants would take available jobs, create congestion in public services, and so forth. However, estimating equations like (3.17) are in fact robust with respect to this sort of relationship between internal and international migration. International migration, if it is to influence internal migration, must alter the internal migrant's perception of public or private net benefits in the origin or destination. Thus the effect of international on internal migration is embedded in the observed values of the public and private sector variables that appear on the right-hand side of the estimating equations.

4 Estimation of Fiscally Induced Migration by Income Class

In Chapter 3, we began the derivation of our own single-equation model of fiscally induced migration, which we intend to estimate using the tax data migration series. In this chapter, following the choice of an estimator and consideration of certain multicollinearity problems, the final basic estimating equation is stated. A discussion of the estimation results completes the chapter.

Choice of Estimator

In choosing an estimator, we follow primarily Theil (1970).[1] For notational convenience, we begin with equation (3.7), which is repeated below:

$$(3.7)\quad \log\left(\frac{P_{ij}}{P_{ii}}\right) = V_j - V_i, \qquad j = 1, \ldots, J \text{ and } j \neq i.$$

Replacing P_{ij} with the obvious estimator M_{ij}/N_i, the ratio of movers from province i to province j to population in province i, and replacing P_{ii} with S_{ii}/N_i, the ratio of stayers in province i to population in province i, yields:

$$(4.1)\quad \log\left(\frac{M_{ij}}{S_{ii}}\right) = [V_j - V_i] + \epsilon_{ij},$$

$$j = 1, \ldots, J \text{ and } j \neq i,$$

$$\text{where } \epsilon_{ij} = \log\left(\frac{M_{ij}}{S_{ii}}\right) - \log\left(\frac{P_{ij}}{P_{ii}}\right).$$

Equation (4.1) can be estimated consistently by the application of generalized least squares. As Theil and others have shown, in the multiple choice case, the ϵ_{ij} can be considered to be asymptotically (as $N_i \to \infty$) multinormally distributed with zero means and a variance-covariance matrix for a given province i, which can be consistently estimated by the inverse of ω_i given below.[2] The diagonal elements in equation (4.2) indicate the presence of heteroscedasticity in the ϵ_{ij} across the provinces of destination. This stems essentially from the fact that the migration decision

$$(4.2)\quad \omega_i = N_i \begin{bmatrix} \frac{M_{i2}}{N_i}\left(1 - \frac{M_{i2}}{N_i}\right) & -\frac{M_{i2}}{N_i} \cdot \frac{M_{i3}}{N_i} & \cdot\cdot & \cdot\cdot & -\frac{M_{i2}}{N_i} \cdot \frac{M_{iJ}}{N_i} \\ -\frac{M_{i2}}{N_i} \cdot \frac{M_{i3}}{N_i} & \frac{M_{i3}}{N_i}\left(1 - \frac{M_{i3}}{N_i}\right) & -\frac{M_{i3}}{N_i} \cdot \frac{M_{i4}}{N_i} & \cdot\cdot & \cdot\cdot \\ \cdot\cdot & -\frac{M_{i3}}{N_i} \cdot \frac{M_{i4}}{N_i} & \cdot\cdot & \cdot\cdot & \cdot\cdot \\ \cdot\cdot & \cdot\cdot & \cdot\cdot & \cdot\cdot & \cdot\cdot \\ -\frac{M_{i2}}{N_i} \cdot \frac{M_{iJ}}{N_i} & -\frac{M_{i3}}{N_i} \cdot \frac{M_{iJ}}{N_i} & \cdot\cdot & \cdot\cdot & \frac{M_{iJ}}{N_i}\left(1 - \frac{M_{iJ}}{N_i}\right) \end{bmatrix}$$

involves choosing one of J discrete alternatives at each point in time.

The individual probabilities P_{ij} can be estimated in the following way. Writing $\hat{L}_{ij}$ for the estimated value of log (P_{ij}/P_{ii}), let:

$$(4.3)\quad A_{ij} = 1 + \sum_{j \neq i}^{J} e^{\hat{L}_{ij}}.$$

Then:

$$(4.4)\quad P_{ii} = 1/A_{ij} \text{ and}$$
$$P_{ij} = e^{\hat{L}_{ij}}/A_{ij}, \quad j = 1, \ldots, J \text{ and } j \neq i.$$

McFadden (1973) and Cox (1970) suggest that, for estimation purposes, the left-hand side of equation (4.1) should be amended to log $[(M_{ij} + \frac{1}{2})/(S_{ii} + \frac{1}{2})]$, since this improves the speed of convergence of the estimators of the coefficients to their large-sample values, by making $E\left\{\log[\cdot]\right\}$ closer to log (P_{ij}/P_{ii}) for any given N_i.

Cox also suggests that, in the bivariate case, an estimator of the variances be based on $[N_i(M_{ij} + 1)(N_i - M_{ij} + 1)/(N_i + 1)(N_i + 2)]$ instead of on the diagonal elements in equation (4.2). The use of this weight seems desirable, because the inverse of the diagonal elements in equation (4.2) becomes arbitrarily large when M_{ij}/N_i approaches either zero or one, while the inverse of this weight does not. However, we shall not use this correction, since it is not clear whether it holds in the multivariate case. In any event, experiments with the diagonal elements of equation (4.2) and with the adjusted weights indicate that it makes virtually no difference to the results which set of weights is used.

For a given province of origin i or for pooled subsets of these provinces, we shall estimate equations like (4.1) by weighted least squares, rather than by generalized least squares, using the diagonal elements $N_i \cdot (M_{ij}/N_i)(1 - M_{ij}/N_i)$ in equation (4.2) as the weights.[3] Using the diagonal elements in equation (4.2) in a weighted least squares procedure gives more weight to cells in any mobility matrix, the larger the N_i. Moreover, it gives less weight to those cells where M_{ij}/S_{ii} is close to zero or one. In that case, small changes in M_{ij}/S_{ii} yield relatively large changes in log (M_{ij}/S_{ii}), and it stands to reason that small weight should be given to observations that are unstable.[4]

The covariance terms (in equation (4.2)) are ignored here because it has not been possible to acquire suitable computer software that will perform generalized least squares or maximum likelihood estimation subject to equation (4.2) in a pooled time-series cross-section context, and that will also allow experimentation with alternative samples and equations at reasonable cost.

Omitting the off-diagonal elements in equation (4.2) is not likely to be a serious problem in the present context however. Since the left-hand side of equation (4.1) has been normalized by the staying choice, as seems natural in the migration context, the number of stayers S_{ii} never appears in the inverse of the appropriate variance-covariance matrix of equation (4.2). In particular, the off-diagonal elements in this matrix are then given by terms like $-N_i \left[M_{ik}/N_i \cdot M_{i\ell}/N_i\right]$ for $k \neq i$ and $\ell \neq i$. Since both M_{ik}/N_i and $M_{i\ell}/N_i$ are typically of an order of magnitude of 10^{-3}, the off-diagonal elements in equation (4.2) are generally of an order of magnitude 10^{-2} smaller than the size of the diagonal elements. For this reason, we may reasonably proceed to estimate via weighted least squares using (only) the diagonal elements as weights.

A Note on Using Grouped Data

Since grouped micro data will be used in the estimation procedure described above, some remarks concerning the relationship between grouping of data and the quality of the estimator chosen are in order.

It is well known (see, for example, Pindyck and Rubinfeld, 1976, p. 251) that grouping introduces an errors-in-variables effect unless all members of a group are homogeneous with respect to the nature of their behaviour. Grouping also results in loss in efficiency even when all the group sizes are equal and intra-group behaviour is homogeneous, since intra-group variation is ignored (Kmenta, 1971, p. 325). We cannot do more than we have about those losses in efficiency, because individual tax files are not, nor should they be, available to us. It can only be pointed out that the migration data have been grouped in a manner (by "income class") integral to the subject of this study, and that the disaggregation of migration flows in a study of fiscally induced migration is a substantial innovation in the Canadian context.

Multicollinearity Problems and a Final Statement of Estimating Equations

Now, substituting subsequent developments in Chapter 3 into equation (3.17) gives the following, where only S_1, S_2, and the error term are not in natural log form, and all variables are deflated by the national consumer price index when this is appropriate:

$$
\begin{aligned}
(4.5)\quad \log\left(\frac{M_{ij} + \frac{1}{2}}{S_{ii} + \frac{1}{2}}\right) = {} & \beta_0 + \beta_1 S_1 + \beta_2 S_2 + \beta_3 Y_j \\
& + \beta_4 Y_i + \beta_5 (\Delta E_j / L_j) \\
& + \beta_6 (\Delta E_i / L_i) + \beta_7 (U_j / \bar{U}) \\
& + \beta_8 (U_i / U) + \beta_9 D_{ij} \\
& + \beta_{10} UIDEX_j + \beta_{11} UIDEX_i \\
& + \beta_{12} GF_j + \beta_{13} GF_i \\
& + \beta_{14} TRF2_j + \beta_{15} TRF2_i \\
& + \beta_{16} GU_j + \beta_{17} GU_i \\
& + \beta_{18} NRR_j + \beta_{19} NRR_i \\
& + \beta_{20} (HP_j - HP_i) \\
& + \beta_{21} TXF_j + \beta_{22} TXF_i \\
& + \text{error}, \\
& j = 1, \ldots, J \text{ and } j \neq i.
\end{aligned}
$$

This equation is not the basic estimating equation that we shall use, however, because of certain multicollinearity problems.

Multicollinearity arises in equation (4.5) for two reasons. First, certain components of fiscal structure may be correlated with the corresponding Y_k. Taxes TXF_k and to a lesser extent other transfers to persons $TRF2_k$ both depend on income. Correlation of GU_k and Y_k may occur because of the dependence of equalization and other unconditional grants on provincial tax revenues. Second, certain elements of fiscal structure tend to be correlated with each other. GF_k, TX_k, $TRF2_k$, $UIDEX_k$, and GU_k may to some extent be correlated with each other because of the nature of fiscal decision making at the federal level.[5] For example, when $UIDEX_k$ increases because of relatively severe unemployment in province k, GF_k may rise as part of a federal strategy to offset the effects of declining employment there. Unconditional grants GU_i and natural resource revenues NRR_j may be correlated across the provinces of origin and destination because of the nature of the equalization program.

Preliminary estimation using the technique outlined in the previous section suggests that we do not have enough data to overcome the multicollinearity problems of the unconstrained equation (4.5). Even though estimation using only private sector explanatory variables yields highly significant coefficients with the expected signs, when equation (4.5) is estimated, the *t*-statistics on the income coefficients drop dramatically and the significance of most coefficients including those of the public sector variables is low.

One straightforward way to reduce the multicollinearity problem is to constrain the coefficients of certain fiscal variables to be equal across provinces, even though this implies that incidence and mix effects associated with these variables are the same across those provinces. (They can still vary with income class, however.) Thus, we have chosen, as our basic estimating equation, equation (4.6), which is stated here and discussed immediately below:

$$
\begin{aligned}
(4.6)\quad \log\left(\frac{M_{ij} + \frac{1}{2}}{S_{ii} + \frac{1}{2}}\right) = {} & \gamma_0 + \gamma_1 S_1 + \gamma_2 S_2 + \gamma_3 Y_j \\
& + \gamma_4 Y_i + \gamma_5 (\Delta E_j / L_j) \\
& + \gamma_6 (\Delta E_i / L_i) + \gamma_7 (U_j / \bar{U}) \\
& + \gamma_8 (U_i / \bar{U}) + \gamma_9 D_{ij} \\
& + \gamma_{10} UIDEX_j + \gamma_{11} UIDEX_i \\
& + \gamma_{12} (GF_j - GF_i) + \gamma_{13} TRF2_i \\
& + \gamma_{14} (GU_j - GU_i) \\
& + \gamma_{15} (NRR_j - NRR_i) \\
& + \gamma_{16} (HP_j - HP_i) + \text{error}, \\
& j = 1, \ldots, J \text{ and } j \neq i.
\end{aligned}
$$

We expect the following coefficients to be positive: γ_1, γ_3, γ_5, γ_8, γ_{10}, γ_{12}, γ_{14}, and γ_{15}. And we expect the following to be negative: γ_2, γ_4, γ_6, γ_7, γ_9, γ_{11}, and γ_{13}. The signs of γ_0 and γ_{16} are not predictable *a priori*. There will be one equation like (4.6) estimated for each income class.

In addition to coefficients constrained to be equal across provinces, equation (4.6) introduces some further simplifications that are also designed to deal with multicollinearity. Notice that in equation (4.6) neither TXF_j nor TXF_i appears. This is justifiable, since federal personal income tax rates are the same for all provinces, while personal tax liabilities are determined by income. Hence the effect of TXF_k on migration, if any, will be included in the coefficient on Y_k. For essentially the same reasons, we could exclude $TRF2_j$ and $TRF2_i$; other transfers to persons (besides unemployment insurance) are essentially the same regardless of where an individual lives in the country, independent of his or her income, or else $TRF2_k$ depends on Y_k. However, we shall, following Courchene, try to capture the effect of transfers on the work-leisure-migration relationship by including $TRF2_i$ (in the origin) on the right-hand side of equation (4.6). We do not expect $TRF2$ to have any regional effects due to differences in transfer rates across provinces, as we have already pointed out, but it may be that a cut (say) in personal transfers in the origin will precipitate a search for additional work, one consequence of which may be interprovincial migration.[6] We also have constrained log (GU_k) to be equal to zero when k refers to Ontario, Alberta, or British Columbia. This has been done in order to effectively eliminate for these provinces the revenue guarantee, a type of unconditional grant that is highly correlated with Y_k. In fact, not doing this results in a dramatic, and in our view, unacceptable drop in the significance of the income coefficients.

On the Possibility of Simultaneous Equation Bias

An additional econometric issue that deserves recognition concerns the possibility of simultaneity of either private sector or public sector variables and migration flows. Unemployment rates often perform poorly in migration equations, and one reason for this may be that migration flows and unemployment rates U_k are simultaneously determined in the current period (Greenwood, 1975). Such simultaneity is not likely to be too serious a problem in equation (4.6) because the unemployment rate in any province k will depend on net flows between province k and all other provinces, as well as other factors, whereas it is the gross flow between province k and one particular province (j) that appears on the left-hand side of equation (4.6).

The housing price index HP_k may also be simultaneously determined with migration flows, since the latter will constitute an important source of the change in demand for housing in any period in province k. We briefly raised this possibility in the last chapter. However, it is total net inflows to province k that will influence HP_k in the current period, along with other factors determining the demand and supply of housing, whereas it is only the gross flow between province k and a particular province that appears as the dependent variable in equation (4.6).

One could also argue that public sector variables in province k depend in part on net migration inflows to province k, as federal, provincial, or local governments respond to demographic developments in this province. The reviews by Greenwood (1975) and Cebula (1979*a*) indicate concern in the migration literature with such a possibility. Here we again rely on the disaggregated nature of the flows on the left-hand side of equation (4.6); there is not likely to be much of a contemporaneous relationship between fiscal structure relevant to province k as a whole on the one hand, and gross flows between province k and a particular origin or destination on the other. Moreover, it seems reasonable to invoke the possibility of lags of at least one period in the response of fiscal structure in province k to net migration inflows from all regions, even in the context of annual data.

Summary of Estimating Equations

The variations on equation (4.6) that have been estimated are given in Table 4-1. The equations are numbered from VII to X, continuing the sequence begun in Table 2-1. All variables in this table are in natural log form except S_1 and S_2. The dependent variable actually used for estimation purposes is the log of $[(M_{ij} + 1/2)/(S_{ii} + 1/2)]$, but the $+1/2$'s are not shown here.

A list of the definitions of the variables in Table 4-1 (and in Tables 4-2 to 4-16) is given in Appendix A. These variables have been previously defined except for $D(GF/N)_{ji}$, $D(GU/N)_{ji}$, and $D(NRR/N)_{ji}$. The symbol $D(\ )_{ji}$ denotes an explanatory variable defined as the difference between the values (for destination j and origin i) of the natural log of the variable in brackets. Our expectations concerning signs of coefficients are repeated in the last row of Table 4-1.

Equations VII and VIII use RP as the regional price index. Recall that RP includes the prices of other commodities besides housing, while HP is solely a housing price index. Equation VII includes $\Delta E/L$ and $U/\bar{U}$, which reflect the uncertainty of employment, whereas equation VIII excludes them on the grounds that Y is in principle a measure of expected employment income, though in practice it may or may not adequately capture expectations with respect to employment opportunity. Equations IX and X are the same as equations VII and VIII, respectively, except that they include HP as the regional price index instead of RP.

Also estimated for selected samples are versions of equations VII to X that assume a first-order autoregressive error structure. This could be the case, for example, if relevant variables omitted from the equations were autocorrelated. As well as providing a very rough check on whether the omission of relevant variables is influencing our conclusions, these equations also provide a rough check on the extent to which multicollinearity in equations VII to X

Table 4-1

Summary of Chapter 4 Estimating Equations

Expected signs			?	+	-	-	+	-	+	-	-	+	+	-	+	-	+	+	?
VII	M_{ij}/S_{ii}	=	C	S_1	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\overline{U}$	$U_i/\overline{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i
VIII	M_{ij}/S_{ii}	=	C	S_1	S_2	D_{ij}	Y_j	Y_i					$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i
IX	M_{ij}/S_{ii}	=	C	S_1	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\overline{U}$	$U_i/\overline{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i
X	M_{ij}/S_{ii}	=	C	S_1	S_2	D_{ij}	Y_j	Y_i					$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i

NOTE Subscripts *i* and *j* refer respectively to the province of origin and the province of destination. See Appendix A for definition of variables.
SOURCE See text.

is still a serious problem. This is because the transformation of equations VII to X that results from a treatment of autocorrelation in the error term may have the effect that collinearity of the transformed variables is less serious than that of the original variables.

The Results: A Detailed Discussion

In this section, we consider in detail the estimation results, which are presented in Tables 4-2 to 4-16. The discussion of these results will be confined primarily to the role of fiscal structure. A summary of the results can be found at the end of the chapter.

Each of the tables gives results for selected migration flows. In view of the issues that were discussed in Chapter 1, as well as the recent interprovincial migration trends that were outlined there, we have concentrated on three particular regional groupings of migration flows: the Atlantic provinces (excluding Prince Edward Island); Alberta and British Columbia; and Ontario. The grouping of migration flows was found necessary because of degrees of freedom problems, which no doubt reflect at least in part the persistence of multicollinearity.[7]

The income class mnemonics used in these tables are: *PNT* – poor without tax payable; *PT* – poor with tax payable; *M* – middle class; *R* – rich; *PNTP* – an aggregation of *PNT* and *PT*; *MR* – an aggregation of *M* and *R*; and *ALL* – an aggregation over all income classes. The exact definition of these income classes and the aggregation methods used to construct them are given in Appendix C.

As in Chapter 2, the significance of coefficients is not explicitly given in Tables 4-2 to 4-16. Again, as in Chapter 2, a statement in the following discussion of results that a coefficient is significant means that it is significant at least at a 10 per cent level.

Out-migration from the Atlantic Region

Tables 4-2 to 4-4 give results for out-migration from the Atlantic region (excluding Prince Edward Island), with and without intra-Atlantic moves in the sample.

Only equations VII and VIII, which use *RP* as the regional price index, are presented here. This is because results for equations IX and X (not shown), which use *HP* as the price index, exhibit large, positive coefficients on $\log(HP_j/HP_i)$ relative to the coefficients on Y_j and Y_i. This is so for both *PNTP* and *MR* income classes. Since most heavily weighted observations in the sample are with an Ontario or Atlantic province destination, these large positive coefficients imply that the odds of moving are very substantially increased if potential migrants expect housing and other assets to appreciate more rapidly in Ontario or another Atlantic province than in the province in which they currently reside.

We find such large coefficients implausible. If migrants are attracted by the expectation of capital gains, our view is that this would show up most clearly in the coefficient on $\log(HP_j/HP_i)$ in the case of migration from the rest of Canada to Alberta and British Columbia (excluding intra-regional moves), as given in Table 4-5. But, in that case, the coefficients on *HP* are negative. We feel therefore that it is unwise to place much reliance on equations that use, in the case of out-migration from the Atlantic region, the relative housing prices. This conclusion is reinforced by the performance of the income variables in equations IX and X, which is much poorer than in equations VII and VIII, especially for the *MR* group. In using equations IX and X for the *MR* group, the coefficients of Y_j and Y_i are not significant, though they are significant for this group when equations VII and VIII are used.

The most unambiguous results on the role of fiscal structure yielded by the equations in Tables 4-2 to

Table 4-2

Estimating Equations for Out-migration from the Atlantic Provinces Excluding Intra-Atlantic Moves, *PNTP* and *MR* Income Classes, 1968-77

Income group	Equation	C	S_1	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\overline{U}$	$U_i/\overline{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i	R^2 S.E.E. D.F.
PNTP	VII	-7.546 (-5.38)	1.791 (10.98)	.094 (0.69)	6.071 (4.97)	-6.309 (-4.90)	.006 (0.40)	-.017 (-1.77)	-.221 (-1.01)	.095 (0.37)	.856 (3.42)	-.891 (-3.63)	-.147 (-1.01)	.474 (1.40)	-.275 (-1.77)	.131 (1.39)	-1.789 (-1.78)	.885 2.301 134
	VIII	-8.028 (-5.94)	1.828 (11.79)	.138 (1.07)	6.269 (5.33)	-6.508 (-5.31)					.940 (4.04)	-.991 (-4.54)	-.013 (-0.11)	.734 (2.37)	-.301 (-2.12)	.203 (2.75)	-1.911 (-2.19)	.880 2.317 138
MR	VII	-6.236 (-3.73)	1.006 (6.69)	-.314 (-2.17)	2.975 (2.34)	-2.456 (-1.87)	.029 (1.83)	-.004 (-0.35)	-.100 (-0.42)	.062 (0.22)	-.029 (-0.11)	-.015 (-0.06)	-.414 (-2.57)	-.559 (-1.50)	-.587 (-3.51)	.062 (0.67)	-.108 (-0.10)	.789 1.824 112
	VIII	-7.236 (-4.64)	1.086 (7.90)	-.234 (-1.74)	3.015 (2.57)	-2.422 (-2.00)					.001 (0.00)	-.027 (-0.12)	-.380 (-2.89)	-.529 (-1.67)	-.528 (-3.43)	.113 (1.58)	-.103 (-0.12)	.782 1.824 116

NOTE All variables are deflated by the Canadian consumer price index (1971 = 100) where appropriate. Summary statistics: R^2 is unadjusted. *S.E.E.* is the standard error of estimate. *D.F.* is the degrees of freedom appropriate for the *t*-statistics given in brackets.

SOURCE Estimates by authors.

Table 4-3

Estimating Equations for Out-migration from the Atlantic Provinces Including Intra-Atlantic Moves, *PNTP* and *MR* Income Classes, 1968-77

Income group	Equation	C	S_1	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\overline{U}$	$U_i/\overline{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i	R^2 S.E.E. D.F.
PNTP	VII	-2.159 (-2.00)	1.106 (10.73)	-.384 (-5.95)	3.992 (5.39)	-4.324 (-5.38)	.014 (1.06)	-.006 (-0.57)	-.244 (-1.10)	.697 (2.77)	.959 (4.39)	-.871 (-3.93)	.157 (1.23)	-.020 (-0.06)	.222 (1.80)	.213 (2.44)	.016 (0.02)	.806 2.744 192
	VIII	-1.935 (-1.77)	1.100 (10.65)	-.353 (-5.45)	4.112 (7.06)	-4.509 (-7.02)					.869 (4.10)	-.721 (-3.52)	.316 (2.75)	-.183 (-0.64)	.161 (1.35)	.281 (3.94)	-.002 (-0.03)	.792 2.812 196
MR	VII	-3.290 (-3.08)	.704 (8.79)	-.477 (-9.50)	1.593 (2.52)	-1.304 (-1.88)	.009 (0.89)	.007 (0.78)	-.158 (-0.81)	.517 (2.27)	.182 (0.98)	-.154 (-0.80)	-.163 (-1.40)	-.629 (-2.13)	-.108 (-0.94)	.152 (2.14)	1.420 (2.06)	.718 1.873 171
	VIII	-3.032 (-2.86)	.702 (8.91)	-.469 (-9.35)	2.284 (4.55)	-2.047 (-3.71)					.041 (0.23)	.052 (0.30)	-.096 (-0.94)	-.758 (-3.14)	-.040 (-0.38)	.138 (2.36)	.064 (0.82)	.706 1.391 175

SOURCE Estimates by authors.

Table 4-4

Estimating Equations for Out-migraton from the Atlantic Provinces Including Intra-Atlantic Moves, Four Income Classes, 1968-77

Income group	Equation	C	S_1	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\bar{U}$	$U_i/\bar{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i	R^2 S.E.E. D.F.
PNT	VII	-6.194 (-7.75)	.552 (4.11)	-.039 (-0.39)	1.412 (1.23)	-1.269 (-1.10)	-.0001 (-0.01)	.012 (1.00)	-1.426 (-4.36)	1.049 (3.22)	1.056 (3.73)	-1.037 (-3.60)	.426 (2.63)	1.220 (2.95)	.009 (0.05)	-.369 (-2.41)	-1.781 (-1.64)	.821 1.207 64
PT	VII	-2.138 (-1.90)	1.053 (10.08)	-.348 (-5.24)	3.826 (5.04)	-4.168 (-5.09)	.014 (1.03)	-.005 (-0.47)	-.248 (-1.09)	.684 (2.67)	1.013 (4.55)	-.936 (-4.13)	.205 (1.56)	.168 (-0.50)	.178 (1.39)	.215 (2.44)	-.072 (-0.09)	.800 2.531 181
M	VII	-3.933 (-3.16)	.672 (8.06)	-.452 (-8.74)	1.403 (2.12)	-.997 (-1.43)	.002 (0.22)	.006 (0.64)	-.36[illegible] (-1.75)	.630 (2.65)	.214 (1.11)	-.178 (-0.89)	-.240 (-2.01)	-.704 (-2.27)	-.040 (-0.34)	.120 (1.62)	1.869 (2.63)	.702 1.701 160
R	VII	-4.184 (-2.05)	.291 (2.30)	-.248 (-2.80)	.925 (0.82)	-.483 (-0.40)	.018 (1.00)	.026 (2.03)	-.046 (-0.14)	-.306 (-0.91)	-.344 (-1.06)	.263 (0.79)	.284 (1.43)	-.772 (-1.59)	-.299 (-1.46)	-.151 (-1.30)	-.854 (-0.83)	.721 1.133 69
ALL	VII	-.654 (-0.75)	.985 (11.18)	-.486 (-8.83)	3.507 (5.50)	-3.958 (-6.06)	.015 (1.40)	-.001 (-0.07)	-.079 (-0.40)	.651 (2.88)	.686 (3.59)	-.609 (-3.13)	.012 (0.11)	-.169 (-0.58)	.131 (1.16)	.224 (2.99)	.536 (0.76)	.801 3.145 208
PNT	VIII	-5.542 (-5.94)	.783 (5.17)	.039 (0.35)	1.902 (1.97)	-2.045 (-2.05)					.945 (2.89)	-.949 (-2.62)	.690 (3.84)	.726 (1.71)	.070 (0.40)	.139 (1.01)	-.090 (-1.18)	.786 1.450 68
PT	VIII	-1.885 (-1.66)	1.046 (10.07)	-.317 (-4.76)	3.914 (6.56)	-4.325 (-6.64)					.920 (4.27)	-.784 (-3.77)	.361 (3.04)	-.339 (-1.17)	.108 (0.88)	.282 (3.96)	-.008 (-0.12)	.786 6.713 185
M	VIII	-4.065 (-3.24)	.576 (8.14)	-.445 (-8.55)	2.436 (4.63)	-2.012 (-3.50)					.019 (0.11)	.066 (0.37)	-.109 (-1.03)	-.713 (-2.75)	.028 (0.25)	.132 (2.17)	.052 (0.64)	.684 1.730 164
R	VIII	-4.329 (-2.07)	.375 (3.03)	-.274 (-3.04)	.798 (0.90)	-.253 (-0.25)					-.410 (-1.33)	.375 (1.26)	.018 (0.10)	-1.422 (-3.69)	-.235 (-1.23)	-.080 (-0.88)	.042 (0.37)	.680 1.179 73
ALL	VIII	-.359 (-0.41)	.956 (10.80)	-.469 (-8.47)	3.733 (7.25)	-4.239 (-8.18)					.578 (3.15)	-.420 (-2.36)	.104 (1.03)	-.386 (-1.55)	.116 (1.10)	.226 (3.64)	.040 (0.63)	.790 3.202 212

SOURCE Estimates by authors.

4-4 are those pertaining to the influence of the unemployment insurance system. In all three tables, *UIDEX* is positive and significant in the destination and negative and significant in the origin for *PNTP*, *PNT*, and *PT* income classes, as expected. For these groups, the origin and destination coefficients on *UIDEX* are in absolute value approximately equal in size. For the *MR*, *M*, and *R* classes, these coefficients are never significant and of the wrong sign in half of the cases, the latter result suggesting that the higher-income groups are more concerned with immediate job prospects, and hence are not likely to move to regions with increasing unemployment rates where *UIDEX* is relatively high as a result.

The role of federal expenditures other than transfers to persons, *D(GF/N)*, is less clear. Table 4-2 (excluding intra-Atlantic moves) indicates that more such expenditure in the Atlantic region relative to the rest of Canada increases the odds of out-migration from the Atlantic provinces for both groups, and this effect is more pronounced for the *MR* group. The coefficients for the *PNTP* group are insignificant. One interpretation of these results is that individuals in the *MR* group are not attracted by relatively high federal expenditure, because this signals adverse economic conditions. This would be consistent with the above interpretation of the "inverted" coefficients of *UIDEX* for this group. When intra-Atlantic moves are included in the sample, as in Table 4-3 or 4-4, the coefficient on *D(GF/N)* is still negative for the higher-income classes (except for the Rich class in Table 4-4 where the coefficient is not significant) but the coefficients for the *PNTP*, *PT*, and *PNT* classes are positive, as expected, and significant in four of the six equations for these classes. This suggests that federal expenditures are more important in determining the migration of low-income groups within the Atlantic region than they are in determining out-migration of the same group from any Atlantic province to the rest of Canada.

Transfers to persons in the origin other than unemployment insurance, *TRF2*, appear to increase the odds of moving out of the Atlantic region for the *PNTP* group in Table 4-2 and the *PNT* group in Table 4-4. This effect is most noticeable for the poorest group, which is not an unreasonable result. These positive coefficients probably indicate that transfers are seen by individuals in these low-income groups as significantly subsidizing moving costs. As expected, the coefficient on other federal transfers is negative and significant for the *MR* class in Table 4-2 (equation VIII), in Table 4-3, and for the *M* class in Table 4-4. Unexpected is the relatively large, negative, coefficient for the *R* class in Table 4-4, which is significant in equation VIII. This result is puzzling, since *TRF2* forms only a small proportion of the total income of those in the Rich income group.

The unconditional grant system does not appear to have retarded out-migration from the Atlantic region when intra-Atlantic moves are excluded from the sample. In Table 4-2, the coefficients on *D(GU/N)* are all negative and significant in equations VII and VIII. But, in Tables 4-3 and 4-4, both of which include intra-Atlantic moves, we find that, as expected, the coefficient on unconditional grants is positive for the *PNTP* class in Table 4-3 (and significant in equation VII) and is positive for the *PNT* and *PT* income classes in Table 4-4.

The unexpected results on the role of unconditional grants in Table 4-2 might be explained in the following manner. It could be that migration out of the Atlantic region is significantly increased by a downturn in this region's macroeconomic activity relative to that in Ontario and the rest of Canada. But such downturns also lead to an increase in equalization payments and other unconditional grants, because of the corresponding fall in provincial tax revenues. If the former relationship is sufficiently strong but is not adequately captured in our equations, then the latter relationship, which tends to lead to a positive, simple correlation between grants to the Atlantic provinces and out-migration from there, could result in a negative coefficient on $D(GU/N)_{ji}$. This econometric problem might not be so severe when intra-Atlantic moves are included, for two reasons. The first is that intra-Atlantic moves are not as likely to be influenced to the same extent by a given interprovincial variation in macroeconomic activity, as are Atlantic-to-Ontario moves. The second is that interprovincial variations in activity within the Atlantic region are not as great as that between the Atlantic provinces (as a region) and Ontario. And indeed, *D(GU/N)* works better (it has positive coefficients for low-income groups) in Tables 4-3 and 4-4 than it does in Table 4-2.

Turning to the role of western natural resource revenues, we find the coefficients on *D(NRR/N)* in Table 4-2 to be positive for the *PNTP* group and larger than the positive coefficients for the *MR* group. The only significant coefficient is in equation VIII for the *PNTP* group. The relative size of these coefficients indicates that poorer individuals are more likely than the rich to be attracted by the expectation of fiscal benefits in the west, which are to be financed by natural resource revenues. When intra-regional moves are included to increase the degrees of freedom, we find that even the *MR* group (Table 4-3) and the *M* group (Table 4-4, equation VIII) are significantly attracted by fiscal benefits based on natural resource revenues, though the coefficients for these groups are still smaller than for the *PNTP*, *PNT*, or *PT* groups.[8]

While the disaggregated results of Table 4-4 generally confirm the results of the previous two tables, note that, for the very poorest income class, *PNT*, the coefficient on *D(NRR/N)* is negative and significant, and the coefficient on RP_j/RP_i is negative and almost significant and also much higher in absolute value than for the other groups. Considering the possible statistical consequences of the positive correlation of *D(NRR/N)* and the housing component of RP_j/RP_i suggests that the very poor have not been inclined to move to Saskatchewan, Alberta, or British Columbia when the fiscal system in those provinces has become relatively more attractive than that in the Atlantic region, because at the same time the price of houses in the west has also increased substantially.

Migration from the Rest of Canada to Alberta and British Columbia

We begin our look at the results for migration from the rest of Canada to oil and gas rich Alberta and British Columbia by noting that equations IX and X, which use *HP* as the regional price index, work better than equations VII and VIII (not shown), which use *RP*. This is the opposite conclusion to that reached at the outset of our discussion of results for out-migration from the Atlantic region. The reason for it is that, in the present case, the coefficients on RP_j/RP_i are positive and implausibly large, in our view, and this is so whether intra-regional moves are included or not. In fact, the coefficients on RP_j/RP_i usually turn out to be larger than those on Y_j and Y_i. Moreover, for the *PNTP* group, the coefficients on Y_j and Y_i are found to be insignificant and of the wrong sign when equation VII or VIII is used, but are of the expected sign and significant when equation IX or X is used. Thus, in Table 4-5 to 4-7, we have only presented results based on equations IX and X.

First, look at the role of unemployment insurance. Coefficients on *UIDEX* are significant and of the expected signs only for the *MR* class in Table 4-5 and the *M* income class in Table 4-7. They are approximately equal in size, as in Tables 4-2 to 4-4. For other income classes, the coefficients on *UIDEX* are generally statistically insignificant, though with the correct signs in Table 4-5.

There is no evidence that federal expenditures have retarded migration to Alberta and British Columbia from the rest of Canada. The coefficient on *D(GF/N)* is either significantly negative or insignificant for all income classes, whether or not intra-regional moves are included in the sample. One interpretation of these results offered earlier is that high levels of federal expenditure in a region are positively correlated with low levels of economic activity there; the latter does not attract in-migrants and may also encourage out-migration. If this interpretation is correct, and since the coefficients on *D(GF/N)* are positive for low-income groups in the case of out-migration from the Atlantic provinces, including intra-Atlantic moves (Tables 4-3 and 4-4), it would suggest that employment opportunities are more important in determining migration from the rest of Canada to Alberta and British Columbia than they are in explaining out-migration from the Atlantic region to the rest of Canada or intra-Atlantic migration. This conclusion is further reinforced by coefficients on $\Delta E/L$, which are almost always significant and always of the correct signs in Tables 4-5 to 4-7, but which are usually insignificant and often of the wrong sign in previous tables for out-migration from the Atlantic region.[9]

In the case of out-migration from the Atlantic provinces, the results indicate that other federal transfers to persons *TRF2* significantly retard out-migration for the *MR*, *M*, and *R* income class, and appear to subsidize out-migration for the lower-income *PNTP* and *PNT* classes. In Tables 4-5 to 4-7, however, these transfers never have a significant retarding effect. The coefficient on $TRF2_j/N_i$ in equation IX is positive and significant for all classes in Table 4-7 except for the *R* class, in which case it is positive but insignificant. In equation X, this coefficient is again positive in Table 4-7 for all income classes except the *R*, and is significant only for the *M* and *ALL* income groups.

Unconditional grants clearly have a retarding effect on migration to Alberta and British Columbia in Table 4-5, as expected. The coefficients on *D(GU/N)* are positive for all groups, significant for the *PNTP* group, and larger for the *PNTP* group than for the richer *MR* group. Including intra-regional moves in Table 4-6 makes all coefficients on grants insignificant. It appears then that the unconditional grant system is more important in retarding migration to Alberta and British Columbia from Saskatchewan and provinces east than it is in determining migration between Alberta and British Columbia. This is a comforting result, since neither of the latter provinces receives equalization payments in our sample period.

In the disaggregated results of Table 4-7, only the *PT* group exhibits a significantly positive coefficient on grants. The coefficients on *D(GU/N)* decline as income increases, if we set aside the *PNT* income class results where the coefficient is negative and insignificant.

Consider now the influence on migration to the west of net fiscal benefits financed by natural resource revenues. The coefficient on *D(NRR/N)* is positive, as expected, for all income groups in Table 4-5, and is significant in equation IX for both *PNTP* and *MR* income groups. The size of the coefficient is

Table 4-5

Estimating Equations for Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77

Income group	Equation	C	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\bar{U}$	$U_i/\bar{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_j/N_j$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNTP	IX	-.240 (-0.14)	-.970 (-7.22)	-.697 (-7.87)	1.011 (1.90)	-1.075 (-2.03)	.211 (3.38)	-.033 (-3.02)	.952 (3.41)	-.251 (-1.20)	.200 (0.81)	-.236 (-0.90)	-.312 (-2.13)	1.301 (3.39)	.188 (2.36)	.233 (2.65)	-.187 (-1.14)	.905 2.284 120
	X	-1.958 (-1.15)	-1.062 (-7.87)	-.673 (-8.49)	1.915 (4.44)	-1.629 (-3.71)					.295 (1.14)	-.215 (-0.78)	-.706 (-5.28)	.585 (1.93)	.196 (2.40)	.069 (1.36)	-.064 (-0.37)	.884 3.572 124
MR	IX	.316 (0.17)	-.948 (-8.33)	-.945 (-11.83)	3.721 (7.88)	-3.564 (-6.94)	.262 (5.02)	-.026 (-2.83)	.865 (3.56)	-.121 (-0.65)	.319 (1.50)	-.370 (-1.64)	-.194 (-1.47)	1.070 (3.22)	.106 (1.38)	.185 (2.36)	-.088 (-0.57)	.949 2.358 109
	X	-.587 (-0.29)	-.984 (-8.10)	-.925 (-12.30)	4.432 (11.23)	-4.214 (-8.77)					.402 (1.75)	-.351 (-1.44)	-.588 (-4.49)	.353 (1.25)	.068 (0.83)	.056 (1.24)	-.037 (-0.21)	.931 2.709 113

SOURCE Estimates by authors.

Table 4-6

Estimating Equations for Migration to Alberta and British Columbia Including Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77

Income group	Equation	C	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\bar{U}$	$U_i/\bar{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_j/N_j$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNTP	IX	4.432 (2.61)	-1.370 (-19.96)	-1.124 (-10.06)	.806 (1.79)	-.931 (-2.02)	.261 (4.20)	-.035 (-2.74)	.466 (2.18)	.169 (0.99)	-.215 (-0.89)	.246 (0.98)	.008 (0.06)	.521 (1.80)	.024 (0.29)	-.098 (-1.89)	-.414 (-2.52)	.893 3.998 140
	X	2.900 (1.63)	-1.392 (-9.87)	-1.089 (-18.69)	1.317 (2.82)	-1.230 (-2.59)					-.474 (-1.92)	.559 (2.17)	-.079 (-0.73)	.029 (0.10)	-.012 (-0.15)	-.118 (-3.55)	-.423 (-2.50)	.872 4.314 144
MR	IX	4.868 (2.73)	-1.249 (-10.88)	-1.241 (-24.18)	3.929 (10.49)	-4.068 (-8.28)	.284 (5.53)	-.028 (-2.59)	.322 (1.76)	.133 (0.91)	.105 (0.51)	-.083 (-0.38)	.014 (0.11)	.263 (1.08)	-.056 (-0.75)	-.094 (-2.15)	-.333 (-2.30)	.935 2.839 129
	X	4.860 (2.47)	-1.263 (-10.15)	-1.225 (-22.92)	4.034 (10.03)	-4.325 (-8.35)					-.180 (-0.84)	.280 (1.25)	-.096 (-0.95)	-.252 (-1.04)	-.084 (-1.05)	-.090 (-3.31)	-.301 (-1.93)	.917 3.174 133

SOURCE Estimates by authors.

Table 4-7

Estimating Equations for Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, Four Income Classes, 1968-77

Income group	Equation	C	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\bar{U}$	$U_i/\bar{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNT	IX	-.073 (-0.06)	-1.142 (-5.26)	-.667 (-6.06)	-.125 (-0.17)	.134 (0.18)	.256 (3.19)	-.035 (-2.46)	.614 (1.53)	.226 (0.83)	-.398 (-1.06)	.335 (0.81)	-.216 (-1.09)	1.054 (1.89)	-.090 (-0.85)	-.071 (-0.55)	-.202 (-0.98)	.830 1.538 73
PT	IX	.489 (0.27)	-1.020 (-7.31)	-.714 (-7.73)	1.591 (2.73)	-1.806 (-3.34)	.198 (3.10)	-.031 (-2.79)	.950 (3.31)	-.320 (-1.49)	.251 (1.01)	-.275 (-1.02)	-.302 (-2.00)	1.152 (2.88)	.213 (2.55)	.258 (2.82)	-.195 (-1.14)	.913 3.122 116
M	IX	2.176 (0.99)	-.933 (-7.49)	-.942 (-11.41)	3.619 (7.14)	-3.913 (-6.70)	.266 (4.83)	-.029 (-2.98)	.908 (3.48)	-.183 (-0.96)	.401 (1.77)	-.454 (-1.88)	-.222 (-1.62)	1.193 (3.35)	.111 (1.40)	.177 (2.12)	-.178 (-1.10)	.949 2.204 104
R	IX	-.384 (-0.18)	-1.179 (-8.01)	-1.001 (-8.78)	4.864 (7.42)	-4.292 (-5.84)	.308 (4.47)	-.014 (-1.17)	.592 (1.81)	.129 (0.49)	-.213 (-0.74)	.136 (0.45)	.166 (0.91)	.368 (0.80)	-.019 (-0.16)	.078 (0.72)	.056 (0.25)	.935 1.348 78
ALL	IX	1.503 (0.99)	-.893 (-7.81)	-.841 (-10.87)	2.037 (4.47)	-2.302 (-5.06)	.243 (4.62)	-.029 (-3.17)	.972 (4.08)	-.156 (-0.87)	.237 (1.13)	-.289 (-1.29)	-.275 (-2.16)	1.249 (3.85)	.145 (2.06)	.219 (2.91)	-.111 (-0.77)	.935 3.683 124
PNT	X	-1.533 (-1.35)	-1.103 (-5.44)	-.537 (-5.48)	.857 (1.57)	-.876 (-1.50)					-5.11 (-1.30)	.542 (1.28)	-.503 (-2.68)	.447 (1.09)	-.089 (-0.87)	-.126 (-1.82)	-.121 (-0.58)	.799 1.631 77
PT	X	-.947 (-0.52)	-1.130 (-3.04)	-.713 (-8.69)	2.429 (5.23)	-2.316 (-5.21)					.365 (1.39)	-.274 (-0.97)	-.697 (-5.01)	.444 (1.42)	.221 (2.60)	.088 (1.69)	-.074 (-0.41)	.894 3.390 120
M	X	-.532 (-0.23)	-.987 (-7.49)	-.924 (-11.81)	4.376 (10.67)	-4.188 (-7.05)					.484 (1.97)	-.432 (-1.66)	-.625 (-4.56)	.492 (1.66)	.092 (1.10)	.040 (0.85)	-.087 (-0.48)	.930 2.534 108
R	X	-1.661 (-0.78)	-1.180 (-7.66)	-.955 (-9.55)	5.548 (10.72)	-4.938 (-7.74)					-.234 (-0.80)	.256 (0.84)	-.158 (-0.91)	-.339 (-0.88)	-.087 (-0.76)	.036 (0.62)	.044 (0.19)	.916 1.496 82
ALL	X	.286 (0.18)	-.961 (-7.98)	-.808 (-11.25)	2.908 (7.54)	-3.024 (-7.60)					.328 (1.44)	-.266 (-1.10)	-.690 (-5.68)	.455 (1.71)	.132 (1.75)	.057 (1.29)	-.014 (-0.09)	.914 4.170 128

SOURCE Estimates by authors.

larger for the *PNTP* group than for the richer *MR* income class. The latter result would be consistent with the existence of progressive fiscal systems in those provinces where the resources are located. But whatever the nature of the progressivity of the provincial fiscal systems in question, the greater importance of fiscal benefits based on natural resource revenues to poorer people is generally confirmed by Table 4-7. Here the coefficient on *D(NRR/N)* is positive and significant only for the *PT* group, and the size of the coefficient generally falls with income. As in the case of migration from the Atlantic region, the coefficient for the poorest *PNT* income classes is negative and significant (equation X). This might be explained by the relative difficulty that these lowest-income individuals would have in financing housing purchases and by the positive correlation of resource revenues and housing prices, as was suggested earlier. In this respect, note that the most negative coefficient on HP_j/HP_i is that for this group and, in Table 4-5, the coefficients on housing prices are more negative for the *PNTP* group than for the *MR* group.

Equations with an Autoregressive Error Structure

Table 4-8 gives alternative estimates for out-migration from the Atlantic provinces (including intra-Atlantic moves) and migration to Alberta and British Columbia (excluding intra-regional moves). The estimates in Table 4-8 are alternatives to those in Tables 4-3 and 4-5, because they are based on the assumption that the error term in each equation has a simple first-order autoregressive structure.

The results in Table 4-8 confirm that, when fiscal variables perform as expected, fiscal structure is shown to be more important for low-income than for high-income groups. In this respect, consider the results for *UIDEX*, *D(GU/N)*, and *D(NRR/N)*. The coefficients on the unemployment insurance variable for the *PNTP* group are larger in absolute value and more significant than those for the *MR* group.[10] This is also the case for the coefficients on unconditional grants and on natural-resource-fueled fiscal benefits. The only explanation for this pattern that we can offer is the intuitively plausible one that fiscal structure matters more for low-income than for high-income individuals, because net fiscal benefits constitute a larger portion of the total comprehensive income of the former.

As before, *D(GF/N)* does not perform well in these equations, since most of its coefficients are negative. *TRF2/N* also performs in an unexpected manner in Table 4-8. In particular, its coefficient is significantly positive in the case of migration to Alberta and British Columbia, and larger in absolute value and more significant for the higher-income *MR* group than for the lower-income *PNTP* group in the case of out-migration from the Atlantic provinces despite the fact that transfers other than unemployment insurance do not form a high proportion of total income for the higher-income group.

Given our *a priori* expectations, why is it that some fiscal variables perform better than others in Table 4-8 (and in the results as a whole)? One obvious answer is that this is a result of using aggregate fiscal variables to proxy the net fiscal benefits relevant to individual migration decisions, and that this is more satisfactory in some cases than in others. We shall have more to say about this possibility below. Another possibility, raised earlier, is the collinearity of fiscal variables such as *GF* and *TRF*2 with aggregate economic activity, coupled with an equation specification that does not adequately control for the relationship between that activity and migration decisions.

Migration from and to Ontario

In Chapter 1, we observed that, in the 1970s, there was a distinct movement away from the centre of the country towards both the more easterly and the more westerly provinces. Having looked at results for the Atlantic region and for Alberta and British Columbia, we consider now the results for migration to and from Ontario.

Table 4-9 gives the results of equation X for migration from Ontario to the rest of Canada. (This equation was chosen because it performed much better than the others in terms of the significance of the expected employment income coefficients, Y_j and Y_i.) Table 4-10 presents results based on the same equation for migration from the rest of Canada to Ontario.

Of all the fiscal variables in Table 4-9 (for out-migration from Ontario), only unconditional grants perform as expected. The coefficient on *D(GU/N)* is positive and significant for the poorest *PNT* group, and insignificant for all higher-income groups. Since Ontario receives no equalization, this result implies that individuals in the *PNT* group are more likely to move to a province when grants to that province are increased.

In Table 4-10, only *UIDEX* performs well. The coefficients on *UIDEX* are of the correct signs and (at times) significant for low-income groups while, for *M*, *R*, and *MR* groups, the coefficients are insignificant. If we set aside the insignificant coefficients on *UIDEX* for the *R* group, we can say that the size of the estimated coefficients for the low-income groups are

Table 4-8

Estimating Equations with First-order Autoregressive Structure, Out-migration from the Atlantic Provinces Including Intra-Atlantic Moves, and Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77

	Income group	Equation	C	S_1	S_2	D_{ij}	Y_j	Y_i	$\Delta E_j/L_j$	$\Delta E_i/L_i$	$U_j/\bar{U}$	$U_i/\bar{U}$	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i	HP_j/HP_i	RHO*
From Atlantic:	*PNTP*	VII	-3.353 (-6.52)	1.132 (9.30)		-.340 (-4.50)	2.413 (3.23)	-2.357 (-3.17)	.005 (0.70)	.011 (2.04)	-.337 (-2.07)	.811 (5.11)	.451 (3.02)	-.427 (-2.91)	-.030 (-0.36)	-.280 (-1.26)	.144 (1.36)	.336 (3.97)	1.386 (1.62)		.688
	MR	VII	-2.840 (-6.52)	.704 (7.35)		-.454 (-7.91)	1.350 (2.05)	-1.180 (-1.78)	.005 (0.65)	.016 (2.49)	-0.082 (-0.46)	.408 (2.29)	-.113 (-0.74)	.134 (0.86)	-.161 (-1.74)	-.560 (-2.42)	-.040 (-0.36)	.183 (2.41)	1.262 (1.78)		.495
	PNTP	VIII	-3.048 (-5.73)	1.069 (8.54)		-.371 (-4.72)	3.676 (4.97)	-3.622 (-4.93)					.344 (2.23)	-.291 (-1.94)	.064 (0.75)	-.380 (-1.66)	.091 (0.83)	.351 (4.26)	.108 (0.13)		.686
	MR	VIII	-2.716 (-6.17)	.692 (7.23)		-.454 (-7.74)	1.788 (2.95)	-1.618 (-2.66)					-.233 (-1.58)	.297 (2.04)	-.160 (-1.82)	-.754 (-3.44)	.008 (0.08)	.170 (2.48)	.705 (1.10)		.507
To Alberta and British Columbia:	*PNTP*	IX	-1.451 (-1.55)		-1.071 (-8.53)	-.616 (-7.14)	1.194 (2.78)	-1.115 (-2.50)	.101 (2.68)	-.013 (-2.13)	.608 (3.29)	-.072 (-0.52)	.189 (1.10)	-.175 (-0.95)	-.285 (-2.61)	1.078 (4.10)	.213 (3.48)	.249 (3.92)		.022 (0.19)	.645
	MR	IX	-.369 (-0.46)		-.885 (-7.29)	-.884 (-10.47)	3.666 (8.48)	-3.520 (-8.04)	.181 (4.34)	-.012 (-1.66)	.808 (3.95)	-.167 (-1.03)	.062 (0.33)	-.110 (-0.55)	-.231 (-1.88)	1.117 (4.12)	.121 (1.71)	.204 (3.01)		-.070 (-0.51)	.445
	PNTP	X	-1.796 (-2.09)		-1.078 (-9.06)	-.599 (-7.55)	1.376 (3.53)	-1.250 (-3.01)					.112 (0.64)	-.037 (-0.20)	-.460 (-4.64)	.639 (2.73)	.211 (3.46)	.148 (3.37)		.130 (1.13)	.673
	MR	X	-.598 (-0.75)		-.912 (-6.82)	-.889 (-11.05)	3.782 (9.13)	-3.634 (-8.55)					.011 (0.05)	.021 (0.10)	-.526 (-4.34)	.552 (2.20)	.098 (1.31)	.068 (1.53)		.004 (0.03)	.522

*RHO is the estimate of the first-order autocorrelation coefficient.

SOURCE Estimates by authors.

Table 4-9

Estimating Equations for Out-migration from Ontario, All Income Classes, 1968-77

Income group	Equation	C	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNT	X	-3.856 (-2.46)	-.304 (-3.79)	4.587 (4.79)	-4.130 (-4.28)	.193 (0.47)	-.341 (-0.72)	-.642 (-3.48)	-1.308 (-1.80)	.346 (2.09)	.032 (0.38)	-.787 (-1.92)	.649 2.017 68
PT	X	1.606 (0.62)	-.286 (-4.47)	3.518 (4.39)	-4.835 (-4.92)	.022 (0.07)	.226 (0.57)	-.632 (-4.43)	-.315 (-0.58)	.172 (1.25)	.054 (0.87)	.781 (2.16)	.820 3.981 69
M	X	-9.254 (-2.84)	-.482 (-7.92)	4.104 (5.02)	-2.699 (-2.75)	-.182 (-0.56)	.464 (1.23)	-.622 (-4.24)	.383 (0.71)	-.101 (-0.78)	.027 (0.45)	.897 (2.57)	.857 3.174 69
R	X	-1.380 (0.42)	-.617 (-8.96)	3.533 (3.80)	-3.564 (-2.95)	-.822 (-2.31)	1.174 (2.86)	-.601 (-3.53)	-.287 (-0.46)	-.046 (-0.31)	.071 (1.12)	1.256 (3.41)	.861 1.798 61
PNTP	X	.053 (0.02)	-.296 (-4.49)	3.594 (4.37)	-4.468 (-4.56)	.044 (0.13)	.138 (0.34)	-.706 (-4.93)	-.482 (-0.85)	.171 (1.22)	.078 (1.23)	.489 (1.32)	.796 4.427 69
MR	X	-3.128 (-0.93)	-.510 (-8.13)	3.842 (4.84)	-3.760 (-3.53)	-.345 (-1.07)	.685 (1.81)	-.598 (-4.07)	.180 (0.33)	-.072 (-0.55)	.020 (0.35)	1.033 (3.01)	.864 3.541 69
ALL	X	2.074 (0.84)	-.469 (-6.61)	3.887 (5.08)	-4.977 (-5.29)	-.217 (-0.67)	.514 (1.34)	-.627 (-4.54)	-.176 (-0.34)	.053 (0.41)	.038 (0.66)	.788 (2.31)	.839 5.387 69

SOURCE Estimates by authors.

Table 4-10

Estimating Equations for Migration from the Rest of Canada to Ontario, All Income Classes, 1968-77

Income group	Equation	C	S_1	S_2	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNT	X	-6.128 (-3.08)	1.251 (6.64)	.425 (0.99)	.268 (1.25)	-2.493 (-2.77)	2.431 (2.72)	.478 (1.47)	-.489 (-1.60)	.006 (0.04)	.016 (0.04)	-.247 (-1.83)	.020 (0.24)	-.375 (-2.37)	.786 1.462 63
PT	X	-9.018 (-3.13)	.829 (4.00)	.434 (1.11)	.491 (2.44)	.624 (0.75)	-.396 (-0.45)	.480 (1.64)	-.482 (-1.76)	.079 (0.54)	-.007 (-0.02)	-.042 (-0.33)	-.011 (-0.15)	-.389 (-2.78)	.793 3.024 67
M	X	-3.495 (-1.05)	.112 (0.65)	-.786 (-1.94)	-.418 (-1.96)	1.396 (1.64)	-1.040 (-1.16)	.172 (0.60)	-.155 (-0.58)	-.056 (-0.38)	-.002 (-0.01)	.064 (0.54)	.008 (0.11)	-.185 (-1.32)	.578 2.431 67
R	X	5.915 (2.08)	-.140 (-0.76)	-2.184 (-4.96)	-1.333 (-5.53)	1.369 (1.42)	-1.363 (-1.34)	-.253 (-0.86)	.232 (0.85)	.145 (0.91)	-.808 (-2.17)	-.185 (-1.38)	.099 (1.30)	-.254 (-1.84)	.841 1.462 62
PNTP	X	-9.126 (-3.46)	.983 (4.96)	.377 (1.02)	.420 (2.23)	-.042 (-0.05)	.464 (0.56)	.470 (1.69)	-.466 (-1.80)	.082 (0.59)	-.056 (-0.16)	-.071 (-0.59)	.007 (0.10)	-.403 (-3.02)	.806 3.145 67
MR	X	1.828 (0.62)	-.017 (-0.11)	-1.217 (-3.36)	-.723 (-3.65)	1.051 (1.36)	-1.322 (-1.68)	.050 (0.20)	-.029 (-0.12)	.012 (0.09)	-.168 (-0.52)	-.019 (-0.17)	.020 (0.32)	-.221 (-1.87)	.677 2.505 67
ALL	X	-.313 (-0.12)	.217 (1.11)	-.430 (-1.19)	-.198 (-0.98)	.768 (1.04)	-1.454 (-1.98)	.298 (1.18)	-.276 (-1.16)	.031 (0.24)	-.094 (-0.29)	-.143 (-1.32)	-.008 (-0.12)	-.320 (-2.66)	.740 3.837 67

SOURCE Estimates by authors.

Table 4-11

Estimating Equations for Out-migration from Manitoba and Saskatchewan, and Migration to Manitoba and Saskatchewan Including Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77

	Income group	Equation	C	S_2	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
From Manitoba and Saskatchewan:	*PNTP*	X	1.939 (1.06)		-.746 (-8.64)	4.375 (6.75)	-5.161 (-6.68)	-.991 (-2.13)	1.082 (2.16)	-.545 (-5.12)	.909 (1.95)	.066 (0.92)	-.022 (-0.34)	-.082 (-0.40)	.690 3.766 111
	MR	X	-4.456 (-2.25)		-.703 (-7.09)	5.270 (7.99)	-4.413 (-7.07)	-.905 (-2.06)	.966 (2.02)	-.203 (-2.09)	-.067 (-0.16)	.008 (0.13)	-.047 (-0.81)	.163 (0.92)	.720 3.096 105
To Manitoba and Saskatchewan:	*PNTP*	X	-.361 (-0.23)	-1.980 (-10.52)	-1.110 (-14.34)	.405 (0.81)	.030 (0.05)	-1.242 (-3.21)	1.149 (3.07)	.681 (7.03)	.633 (1.94)	.090 (1.54)	-.136 (-2.42)	-.162 (-1.08)	.859 2.931 122
	MR	X	3.875 (2.22)	-1.516 (-9.49)	-1.140 (-16.62)	3.388 (7.09)	-3.890 (-7.01)	-1.062 (-3.03)	.926 (2.69)	.167 (1.94)	.169 (0.55)	.118 (2.20)	-.138 (-2.63)	-.098 (-0.70)	.910 2.303 109

SOURCE Estimates by authors.

Table 4-12

Estimating Equations for Out-migration from Quebec and Migration from the Rest of Canada to Quebec, *PNTP* and *MR* Income Classes, 1968-77

	Income group	Equation	C	S_1	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
From Quebec:	*PNTP*	X	1.102 (0.77)		-1.092 (-18.95)	6.386 (14.46)	-6.437 (-11.37)	.116 (0.38)	-.151 (-0.55)	-1.060 (-5.78)	.001 (0.00)	-.071 (-0.44)	.029 (0.45)	.765 (4.40)	.960 2.512 67
	MR	X	-.249 (-0.13)		-1.189 (-19.15)	5.362 (11.33)	-4.941 (-7.34)	-.544 (-1.78)	.489 (1.80)	-.870 (-4.46)	-.552 (-1.23)	-.038 (-0.24)	.007 (0.10)	.950 (5.22)	.967 2.401 67
To Quebec:	*PNTP*	X	-4.600 (-6.03)	1.088 (9.46)	-.369 (-10.27)	-1.790 (-5.58)	2.089 (5.93)	-.025 (-0.13)	-.020 (-0.09)	.293 (2.55)	.243 (1.05)	-.266 (-3.17)	.032 (0.54)	-.513 (-3.89)	.865 1.398 63
	MR	X	9.009 (-4.05)	.537 (2.96)	-.430 (-7.52)	2.508 (4.57)	-.985 (-1.23)	-.517 (-1.64)	.719 (2.04)	-.066 (-0.40)	-1.394 (-3.76)	.086 (0.59)	.052 (0.51)	-.305 (-1.47)	.787 2.115 65

SOURCE Estimates by authors.

also considerably larger in absolute value than those for high-income groups.

Comparing Tables 4-9 and 4-10 with previous tables, with respect to the role of fiscal structure, it would appear that fiscal variables do not perform as well (in terms of the signs and significance of coefficients) in explaining migration to and from the centre of the country as they do in explaining migration flows from the east or to the west. It appears that the results with respect to the nature and extent of fiscally induced migration can vary importantly with the geographical composition of the migration flows considered. This conclusion is reinforced if we go back for a moment to earlier results and compare Tables 4-2 to 4-4 (out-migration from the Atlantic provinces) as a whole with Tables 4-5 to 4-7 (migration to Alberta and British Columbia). Generally speaking, *UIDEX* performs somewhat better (in terms of the sign and significance of coefficients) in the former set of tables than in the latter. *D(GU/N)* and *D(NRR/N)*, on the other hand, generally perform better in the case of migration to Alberta and British Columbia. We will consider possible reasons for regional variation in our results below.

Migration from and to Manitoba and Saskatchewan and from and to Quebec

For completeness, we have included results for Manitoba and Saskatchewan (Table 4-11) and for Quebec (Table 4-12), but only for *PNTP* and *MR* income classes and only for the one equation (equation X) that gave the best results overall. The sample for Manitoba and Saskatchewan includes intra-regional moves.

We will not comment on these results here, except to note that fiscal structure clearly does not work well in explaining these flows. The results in Tables 4-11 and 4-12 therefore emphasize the variation in the results across regions, as noted above.[11] A further comment on these results will be given in the course of the summary at the end of this chapter.

Table 4-13

Summary of Results Concerning the Influence of Fiscal Structure on Out-migration from the Atlantic Provinces and In-migration to Alberta and British Columbia, 1968-77

			Sign of coefficients in estimated equations							
			Out-migration from Atlantic provinces				In-migration to Alberta and British Columbia			
Variable	Expected sign of coefficient		Low income		High income		Low income		High income	
			(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)
$UIDEX_j$	+	Occurs in no. of equations	8	0	4	4	6	2	6	2
		Of which significant	8	0	0	0	0	0	3	0
		Of which not significant	0	0	4	4	6	2	3	2
$UIDEX_i$	-	Occurs in no. of equations	0	8	6	2	2	6	3	5
		Of which significant	0	8	1	0	0	0	0	2
		Of which not significant	0	0	5	2	2	6	3	3
$D(GF/N)_{ji}$	+	Occurs in no. of equations	7	1	2	6	0	8	1	7
		Of which significant	4	0	0	3	0	7	0	4
		Of which not significant	3	1	2	3	0	1	1	3
$TRF2_j/N_i$	-	Occurs in no. of equations	2	6	0	8	8	0	7	1
		Of which significant	2	1	0	7	6	0	5	0
		Of which not significant	0	5	0	1	2	0	2	1
$D(GU/N)_{ji}$	+	Occurs in no. of equations	8	0	2	6	6	2	6	2
		Of which significant	1	0	0	0	6	0	1	0
		Of which not significant	7	0	2	6	0	2	5	2
$D(NRR/N)_{ji}$	+	Occurs in no. of equations	7	1	6	2	6	2	8	0
		Of which significant	6	1	5	0	5	1	3	0
		Of which not significant	1	0	1	2	1	1	5	0

NOTE The group Low Income is made up of the *PNT*, *PT*, and *PNTP* income classes; the group High Income is made up of the *M*, *R*, and *MR* income classes.

SOURCE Based on equations in Tables 4-3 to 4-5, and in Tables 4-7 and 4-8.

Reasons for Differences in the Results across Regions

As we have noted at several points in the preceding discussion, the results exhibit noticeable differences across regions with respect to the role of fiscal structure. Tables 4-13 and 4-14 confirm this observation. Table 4-13 summarizes the signs and statistical significance of coefficients on fiscal variables in Tables 4-3 to 4-5 and in Tables 4-7 and 4-8, where fiscal structure performs reasonably well. Table 4-14 presents the same type of summary based on all the results reported in this chapter. It is clearly apparent from a comparison of these tables that fiscal structure performs better in terms of expected signs and statistical significance of coefficients in explaining out-migration from the Atlantic region and in-migration to Alberta and British Columbia than it does in explaining the other flows considered.

Why do the results regarding the role of fiscal structure vary with the sample of migration flows choosen for consideration? In general, there are three reasons that separately or in combination could explain this feature of our results. The behaviour of migrants could vary across the regions of origin or destination. The constraints faced by migrants, including the fiscal structure relevant to them, could vary systematically with our choices of regions of origin or destination. And finally, econometric problems, such as those of using data on aggregate fiscal variables in a model of individual migration decisions, might be more serious for some migration flow samples than for others.

The difference in our results across migration flow samples regarding the influence of fiscal structure could be explained by differences in behaviour if some migration flows contain a much higher proportion of return migrants. Return migrants may not be motivated by narrowly defined economic prospects (including net fiscal benefits) to the same extent or in the same manner as first-time migrants.

Evidence in Gauthier (1980*b*) suggests that migration from the rest of Canada to the Atlantic region is

Table 4-14

Summary of Results Concerning the Influence of Fiscal Structure on Interprovincial Migration, Canada, 1968-77

Variable	Expected sign of coefficient		Sign of coefficients in estimated equations			
			Low income		High income	
			(+)	(-)	(+)	(-)
$UIDEX_j$	+	Occurs in no. of equations	24	12	16	20
		Of which significant	11	6	3	7
		Of which not significant	13	6	13	13
$UIDEX_i$	-	Occurs in no. of equations	13	23	21	15
		Of which significant	4	12	10	2
		Of which not significant	9	11	11	13
$D(GF/N)_{ji}$	+	Occurs in no. of equations	18	18	12	24
		Of which significant	9	13	4	14
		Of which not significant	9	5	8	10
$TRF2_i/N_i$	-	Occurs in no. of equations	23	13	14	22
		Of which significant	15	2	7	10
		Of which not significant	8	11	7	12
$D(GU/N)_{ji}$	+	Occurs in no. of equations	20	16	14	22
		Of which significant	8	9	2	5
		Of which not significant	12	7	12	17
$D(NRR/N)_{ji}$	+	Occurs in no. of equations	23	13	24	12
		Of which significant	12	8	8	8
		Of which not significant	11	5	16	4

NOTE The group Low Income is made up of the *PNT*, *PT*, and *PNTP* income classes; the group High Income is made up of the *M*, *R*, and *MR* income classes.

SOURCE Based on all equations in Tables 4-2 to 4-12, and in Tables 4-15 and 4-16.

one flow that is likely to contain a high proportion of return migrants. Table 4-15 gives results of equation VIII for this flow (including intra-Atlantic moves). None of the fiscal variables in Table 4-15 are significant with the expected signs. This is in marked contrast to the performance in Table 4-3 of fiscal variables in explaining out-migration from the Atlantic provinces. Comparison of Tables 4-15 and 4-3 suggests therefore that differences in our results across regions regarding the role of fiscal structure can be partly explained by the difference in the proportion of return migrants in these flows. The results of Table 4-15 also suggest that the role of fiscal structure in the reduction of net out-migration from the Atlantic region during the last ten years or so is to be found in its influence on gross out-migration rather than on gross in-migration. The only result that prevents us from drawing this conclusion without reservations for all income classes is the positive, significant coefficient on unconditional grants in Table 4-9 (out-migration from Ontario) for the *PNT* class.

Another flow likely to contain a high proportion of return migrants is migration from Alberta and British Columbia to the rest of Canada. Results of equation X for migration from Alberta and British Columbia to the rest of Canada (excluding intra-regional moves) are given in Table 4-16. Here the only fiscal variable with coefficients of the expected sign is *D(GF/N)*.[12] A comparison of Tables 4-16 and 4-5 suggests again that return migration can explain at least part of the difference in results across regions, since fiscal variables perform much better in Table 4-5 than in Table 4-16. This comparison also suggests that the role of fiscal structure in the recent westward population drift is to be found in the determinants of gross out-migration from the rest of Canada to the western provinces, rather than in the determinants of flows in the opposite direction.[13]

To summarize the discussion so far, then, Tables 4-15 and 4-16 suggest that part of the variation in our results across regions can be explained by corresponding differences in the proportions of return migrants.

An econometric problem, mentioned above, that might also contribute to regional variation in the results stems from the use of aggregate data to measure the fiscal structure relevant to individual migration decisions. Notice that, in Tables 4-15 and 4-16, the income coefficients all have the expected signs. This is a distinct improvement over the results of Chapter 2, which are based on the use of highly aggregated income data. In Chapter 2, the signs of the income coefficients in Table 2-3 for (return) migration to the Atlantic provinces are inverted. This improvement over the Chapter 2 results probably stems from the use of income proxies based on aggregation over the actual incomes of the migrants represented on the left-hand side of our estimating equations. Such consistent aggregation enables us to cope with situations in which the constraints relevant to migrants differ from those faced by the general population in any province.

If the fiscal structure relevant to migrants in a given income group is not adequately represented by the sort of provincial fiscal aggregates used, and if the adequacy of this proxy varies with the sample of migration flows being considered, then the use of these provincial fiscal aggregates could result in estimates that vary across regions. We cannot offer any firm empirical evidence on the extent to which this problem is responsible for the difference in our results across regions, but the pronounced improvement in the income coefficients between Chapters 2 and 4 suggests that it is likely to be of some importance.

To complete this discussion of reasons for differences in the results by region, we consider another factor that at the same time involves differences across samples in the fiscal constraints faced by migrants, as well as an econometric issue. When the differences across regions in fiscal structure are dramatic, it is reasonable to suppose that fiscal structure will exert a greater influence on the migration decisions of migrants than when such is not the case. This, in turn, would result in a stronger simple correlation between the corresponding aggregate migration flows and the differential fiscal structure. Thus, when the migration flows under consideration are between regions that exhibit relatively dramatic differences in certain aspects of fiscal structure, we might expect those aspects of fiscal structure to perform better statistically in our equations than when this is not the case. Such reasoning could obviously apply (see the tables in Chapter 1) to unemployment insurance in outflows from Atlantic Canada to Ontario, or to natural resource revenues in migration to Alberta and British Columbia from the rest of Canada. Indeed, as we have noted above, *UIDEX* performs somewhat better in explaining out-migration from the Atlantic region than migration to Alberta and British Columbia, while the opposite is the case for *D(NRR/N)*. Together with the relative absence of return migrants, this factor might explain why fiscal structure performs best in explaining gross outflows from Atlantic Canada and gross inflows to Alberta and British Columbia.

Table 4-15

Estimating Equations for Migration to the Atlantic Provinces Including Intra-Atlantic Moves, All Income Classes, 1968-77

Income group	Equation	C	S_2	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	RP_j/RP_i	R^2 S.E.E. D.F.
PNT	VIII	-4.914 (-4.87)	-.840 (-4.02)	-.172 (-1.59)	.041 (0.04)	.136 (0.13)	-1.080 (-3.88)	1.102 (3.59)	-413 (-2.58)	.307 (0.58)	-.441 (-2.26)	.115 (0.26)	1.268 (1.17)	.754 1.361 60
PT	VIII	-1.816 (-1.91)	-1.647 (-15.89)	-.390 (-7.97)	1.700 (3.34)	-1.986 (-3.96)	.218 (1.36)	-.115 (-0.67)	.070 (0.80)	-.261 (-1.06)	-.146 (-1.31)	-.015 (-0.20)	.451 (0.76)	.814 2.063 171
M	VIII	-2.458 (-1.58)	-1.346 (-12.51)	-.389 (-8.04)	6.204 (11.40)	-6.354 (-9.49)	.120 (0.68)	-.142 (-0.76)	.070 (0.69)	.044 (0.17)	.153 (1.26)	-.121 (-1.52)	-1.087 (-1.75)	.904 1.732 148
R	VIII	-.708 (-0.28)	-1.044 (-6.28)	-.207 (-2.31)	8.908 (9.35)	-9.331 (-8.83)	-.113 (-0.37)	-.018 (-0.05)	-.109 (-0.58)	-.609 (-1.28)	-.258 (-1.30)	-.333 (-1.68)	.444 (0.41)	.908 1.326 68
PNTP	VIII	-1.739 (-1.82)	-1.550 (-15.04)	-.440 (-9.16)	.769 (1.55)	-1.021 (-2.11)	-.040 (-0.25)	.140 (0.82)	.010 (0.12)	-.211 (-0.87)	-.184 (-1.73)	-.029 (-0.38)	.323 (0.56)	.799 2.245 180
MR	VIII	-.855 (-0.77)	-1.208 (-12.92)	-.405 (-9.69)	6.329 (13.50)	-6.787 (-12.60)	.008 (0.05)	-.021 (-0.13)	.088 (1.01)	-.001 (-0.01)	.107 (1.03)	-.115 (-1.65)	-1.222 (-2.34)	.921 1.730 167
ALL	VIII	.431 (0.55)	-1.285 (-14.35)	-.497 (-12.70)	2.854 (7.10)	-3.550 (-7.64)	-.064 (-0.48)	.151 (1.05)	.092 (1.23)	-.074 (-0.36)	-.123 (-1.40)	-.083 (-1.32)	-.753 (-1.54)	.879 2.506 209

SOURCE Estimates by authors.

Table 4-16

Estimating Equations for Out-migration from Alberta and British Columbia Excluding Intra-regional Moves, All Income Classes, 1968-77

Income group	Equation	C	D_{ij}	Y_j	Y_i	$UIDEX_j$	$UIDEX_i$	$D(GF/N)_{ji}$	$TRF2_i/N_i$	$D(GU/N)_{ji}$	$D(NRR/N)_{ji}$	HP_j/HP_i	R^2 S.E.E. D.F.
PNT	X	-7.235 (-5.47)	-.006 (-0.05)	3.308 (4.42)	-3.192 (-3.73)	-.521 (-0.96)	.327 (0.62)	.617 (3.02)	2.720 (4.85)	-.189 (-1.69)	-.323 (-3.69)	.566 (2.56)	.570 1.749 68
PT	X	-3.251 (-1.62)	-.192 (-2.36)	6.192 (12.04)	-6.878 (-10.41)	-.594 (-1.83)	.353 (1.12)	.476 (3.03)	3.341 (8.21)	-.267 (-2.77)	-.317 (-5.11)	.506 (3.10)	.796 3.052 115
M	X	-7.091 (-2.68)	-.178 (-2.49)	6.448 (12.77)	-6.198 (-7.71)	-.634 (-2.11)	.555 (1.89)	.413 (2.66)	2.159 (5.69)	-.237 (-2.49)	-.341 (-5.66)	.466 (3.11)	.830 2.230 101
R	X	-7.753 (-4.33)	.440 (4.42)	6.453 (9.60)	-6.606 (-8.45)	-1.028 (-2.33)	1.013 (2.34)	.447 (2.31)	-.610 (-1.51)	-.464 (-3.36)	-.349 (-5.05)	.090 (0.47)	.853 1.374 61
PNTP	X	-3.775 (-1.91)	-.204 (-2.42)	6.065 (12.09)	-6.622 (-9.43)	-.666 (-2.05)	.410 (1.30)	.520 (3.37)	3.420 (8.29)	-.280 (-2.98)	-.333 (-5.35)	.490 (2.99)	.794 3.347 118
MR	X	-6.381 (-3.69)	-.061 (-0.83)	6.834 (14.76)	-6.857 (-10.11)	-.717 (-2.64)	.671 (2.50)	.451 (3.28)	1.626 (5.02)	-.272 (-3.04)	-.349 (-6.61)	.388 (2.80)	.861 2.311 110
ALL	X	1.876 (-1.20)	-.086 (-1.29)	6.886 (15.47)	-8.016 (-11.93)	-.682 (-2.54)	.563 (2.14)	.543 (4.15)	2.512 (7.69)	-.320 (-3.91)	-.391 (-7.22)	.429 (3.13)	.851 3.653 128

SOURCE Estimates by authors.

A Summary of Tax Data Results Concerning Fiscally Induced Migration

We conclude the chapter by summarizing the statistical results as they bear, in our view, on the nature and extent of fiscally induced interprovincial migration in Canada between 1968 and 1977.

- In our view, the estimates discussed in this chapter indicate that fiscal structure has (in the statistical sense) significantly influenced migration decisions in our samples. However, this influence varies importantly with income class and region.

- When fiscal variables perform as expected, in terms of *a priori* expectations concerning the sign of coefficients, the results indicate that fiscal structure generally influences the poor and middle-income classes to a greater extent than it does the rich income class;[14] that is, coefficients on public sector variables for income groups below $20,000 (in 1977 dollars) tend to be larger in absolute size and of greater statistical significance than the corresponding coefficients for the rich income class. Quantitative simulations in the next chapter using the results in Tables 4-2, 4-3, and 4-5 will confirm this difference in the impact of fiscal structure across income groups.

- Fiscal structure generally appears to be more important in determining gross out-migration from the Atlantic provinces and gross in-migration to Alberta and British Columbia than in determining gross flows (in-migration to the Atlantic region and out-migration from Alberta and British Columbia) in the opposite directions.[15] This may be a result of the presence of return migrants in these latter flows who are not significantly motivated by differences in net fiscal benefits across provinces.

- Concerning the role of specific fiscal variables,

a/ with respect to regional variation in the generosity of the unemployment insurance system:

The detailed discussion of the previous section indicates that unemployment insurance generosity indices for both the origin and destination provinces play a significant role in explaining certain interprovincial migration flows. Our results show that the unemployment insurance system tends to both reduce and increase the odds of moving, at least in two cases: the poor contemplating a move from the east coast, and the middle-income group considering a move westward.[16]

The positive and significant coefficients on the unemployment insurance generosity index for the destination province indicate that the greater the expected present value of unemployment insurance benefits in that destination, the more likely the out-migrant is to move there. This could mean, following Todaro (1969), that some low-income individuals have been induced by the unemployment insurance system to move from the Atlantic region to relatively high-unemployment areas in Ontario or provinces west, for example, in order to search for scarce but relatively well-paying jobs. Simulations to be presented in the next chapter suggest that this migration-enhancing aspect of the unemployment insurance system generally dominates its migration-retarding aspect in outflows from central Canada to Alberta and (especially) British Columbia. These simulations will indicate that the retarding effects generally dominate in outflows from the Atlantic provinces to central Canada.

b/ with respect to unconditional (mainly equalization) grants:

Considering migration from an Atlantic province, we have found significant effects in the expected direction (discouraging out-migration from provinces receiving equalization payments or encouraging migration to such provinces) only for the poor income groups and only when other Atlantic provinces are included as destinations along with the six provinces west of the Atlantic region. Migration to the Atlantic region of low-income individuals may be significantly increased by equalization payments to that region as is suggested by the significant, positive coefficient on *D(GU/N)* for the poor income groups in the equation explaining out-migration from Ontario. We have also found that unconditional grants have significantly retarded the out-migration of low-income groups from the rest of Canada to Alberta and British Columbia. Since the unconditional grant variable *D(GU/N)* has the value zero for Ontario, this result refers to migration from the Atlantic provinces, Quebec, Manitoba, and Saskatchewan to Alberta and British Columbia.

c/ with respect to western natural resource revenues:

It would appear that fiscal benefits fueled by western resource revenues do significantly attract individuals in the *PT* and *M* income classes, with the effect being strongest for the former. More precisely, after allowing for the effect on migration decisions of differences across regions in current employment opportunities, housing prices, and other "private sector" variables, there would still appear to be a statistically significant role in the estimating equations for the expectation of fiscal benefits (including, possibly, future provincially financed job opportunities) based on western resource tax revenues. This is so both in equations explaining out-migration from the Atlantic region and in those explaining in-migration to Alberta and British Columbia.

The very poor paying no tax (*PNT*) and the rich (*R*) are apparently not significantly attracted by the expectation of fiscal benefits based on resource revenues. A likely explanation for the results concerning the poorest group is to be found in the retarding effect for this group of relatively high western housing prices. The coefficient on the relative regional price variable is more negative and more significant for this poorest income group than for higher-income groups, both in the case of out-migration from the Atlantic provinces and in the case of in-migration to Alberta and British Columbia. An explanation for the results concerning the rich income group may be found in the relative unimportance for these individuals of net fiscal benefits as a component of their comprehensive income. Moreover, the rich are less likely to face liquidity constraints that might prevent the capturing of any sizable resource-fueled fiscal benefits (when they are capitalized into housing prices) without migration to the west being necessary.

d/ with respect to transfers (other than unemployment insurance) to persons:

Except in the case of out-migration from Ontario to the rest of Canada, where other transfers retard migration of the very poorest paying no income tax, these transfers appear to subsidize migration of the poor income groups. Unexpectedly, the results indicate that other transfers retard out-migration from the Atlantic provinces of the *M* and *R* income groups, and appear to subsidize migration of these same income groups to Alberta and British Columbia. This is unexpected, since other transfers do not on the average constitute a large part of total income for these groups.

e/ and, finally, with respect to federal expenditures:

Our results suggested that federal expenditures have had a significant role in the expected direction in determining migration within the Atlantic region, and to Manitoba and Saskatchewan. In these cases, the effect is strongest for the poor income groups. But generally this variable performed the least well of all the fiscal variables. We have suggested that this might be the result of the negative correlation of federal purchases and provincial economic activity, coupled with an inadequate representation in our equations of the relationship between aggregate activity in a province and migration behaviour. The same problem could also lie behind the unexpected performance of the other-transfers variable.

The conclusion that fiscal structure influences low-income individuals to a greater extent than high-income individuals is intuitively plausible for the obvious reason: it is likely that net fiscal benefits form a larger proportion of the comprehensive income of poorer people. We cannot think of a plausible reason why our results might exhibit this pattern over income groups (a pattern confirmed by quantitative simulations in the next chapter) and yet simply be the result of spurious correlation that has nothing to do with a systematic relationship between internal migration and fiscal structure. In our view, therefore, this result strongly supports the general conclusion that fiscal structure is a significant determinant of interprovincial migration decisions.

5 The Quantitative Importance of Fiscal Structure

Methodology

The statistical significance of fiscal structure in a migration equation is one thing, and its quantitative impact on migration flows is another. The latter is determined by the product of the estimated coefficients in our equations and changes in the values of the corresponding fiscal variables.

In this chapter, we simulate the quantitative impacts of selected changes in fiscal structure on interprovincial migration. In addition to providing a general sense about the order of magnitude of these impacts, these simulations also yield interesting information about the role of specific fiscal variables. As we have noted in the previous chapter, they indicate whether it is the migration-enhancing or the migration-retarding effects of the unemployment insurance system that dominate in particular migration flows. Moreover, while the statistical results of Chapter 4 indicated that both poor and middle-income individuals have been influenced significantly by fiscal structure, the simulations suggest that, generally speaking, fiscal structure has quantitatively influenced the poor to a greater extent regardless of the migration flow being considered.

The simulations are directed towards answering the following question: what has been the impact on migration rates of the changes that occurred between 1971 and 1977 in the unemployment insurance system, in the system of equalization payments, and in western natural resource revenues? More specifically, the simulations show how estimated migration rates differ from what they would have been, if, in 1977:

- the post-1971 regional variation in the maximum number of weeks for which unemployment insurance benefits could be received had not been in effect;
- equalization payments were reduced to their 1971 level, thus eliminating the increase that occurred in these transfers, for whatever reason, between 1971 and 1977; and
- western natural resource revenues were reduced to their 1971 level (this is roughly equivalent to a situation in which post-1971 increases in western resource revenues would have been shared equally across the country on a per capita basis so that they would not be the cause of differences in net fiscal benefits across regions).

For the purpose of this exercise, all other migration determinants besides the three listed above were maintained at their 1977 levels.

Since the statistical results of Chapter 4 indicated that fiscal structure appears to be most relevant to out-migration from the Atlantic region and to in-migration to Alberta and British Columbia, only the results for those samples were used in conducting the following simulations. First, using selected equations and 1977 values of all explanatory variables, the probabilities P_{ij} in equation (3.5) were estimated using the expressions in equation (4.4). These calculated probabilities served as estimates of migration rates, since the probability of moving from province i to province j is just the ratio of movers from province i to province j to the population in province i. In order to compute probabilities when the equations being used were estimated with a sample that did not include an exhaustive list of nine alternative destinations, it was assumed that migration behaviour from the origin to these missing destinations could be approximated using the same estimates of coefficients.[1] Second, the menu of changes in fiscal structure listed above was introduced into the vector of origin and destination attributes, and new estimates of migration rates were calculated. Third, percentage changes in migration rates between the two series were then computed for each origin/destination pair of migration flows. This was done for each of the three fiscal variables alone, all other variables including the other two fiscal variables of interest held constant at their 1977 levels, as well as for the entire set of changes together. And, finally, to provide a reference point, we have also considered in the same way the effect on migration rates of eliminating the post-1971 developments in regional expected employment income differentials, with all other private sector variables and all fiscal variables held at their 1977 levels.

The results of these simulations are given in Tables 5-1 to 5-6. A negative (positive) sign in these tables means that the 1971 to 1977 change in the variables indicates reduced (increased) out-migration rates or, more precisely, that the estimated probability of out-migration in 1977 is higher (lower) with the specified variables at their 1971 levels than it is with these variables at their 1977 levels (all other variables being held constant at their 1977 levels).

Out-migration from the Atlantic Provinces

Consider first the simulation results in Tables 5-1 to 5-4, which are based on equations for out-migration from the Atlantic provinces, with and without intra-Atlantic moves in the sample, beginning with the role of the unemployment insurance system. It was noted in Chapter 4 that the modifications in 1971 to the unemployment insurance system have had the effect of both increasing and reducing mobility. The simulations permit a computation of the net effect of the unemployment insurance system on out-migration rates.

For the *PNTP* group, the results in Table 5-1 (excluding intra-Atlantic moves) indicate that the rate of out-migration to Ontario (the most preferred destination for out-migrants from the Atlantic region) was between 35 and 42 per cent lower in 1977 than it would have been in the absence of any changes to the unemployment insurance system.[2] When moves within the Atlantic provinces are included (Table 5-2), the destination unemployment insurance generosity index becomes more important. Indeed, this simulation indicates an increase in the rate of out-migration to other Atlantic provinces by as much as 50 per cent, while the reduction in the rate of out-migration to provinces outside the Atlantic region is less than half of what it is in Table 5-1.

For the *MR* group (Table 5-3), the reduction in out-migration rates to the six provinces west of the Atlantic region is only 5 or 6 per cent. This is much smaller than the corresponding reduction for the *PNTP* group. And when intra-regional moves are included (Table 5-4), the migration rates to other Atlantic provinces increase by about 20 per cent, which is about one-third to one-half the corresponding increase for the *PNTP* group in Table 5-2.

Table 5-1

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Excluding Intra-Atlantic Moves, *PNTP* Income Class, 1968-77*

Origin (*i*)	Destination (*j*)	P1977	Δ(*UI*)	Δ(*GU*)	Δ(*NRR*)	Δ(*UI, GU, NRR*)	Δ(*Y*)
Newfoundland	Ontario	0.0204	-0.363	0.089	0.000	-0.310	-0.278
	Manitoba	0.0016	-0.439	-0.178	0.000	-0.541	0.020
	Alberta	0.0069	-0.465	0.089	0.423	-0.173	0.514
	British Columbia	0.0054	-0.299	0.089	0.074	-0.181	-0.052
Nova Scotia	Quebec	0.0015	-0.063	0.132	0.000	0.054	-0.117
	Ontario	0.0127	-0.351	0.285	0.000	-0.172	-0.366
	Manitoba	0.0010	-0.429	-0.030	0.000	-0.450	-0.104
	Saskatchewan	0.0021	-0.504	0.624	0.399	0.121	1.011
	Alberta	0.0050	-0.455	0.285	0.424	-0.008	0.329
	British Columbia	0.0037	-0.286	0.285	0.075	-0.028	-0.168
New Brunswick	Quebec	0.0103	-0.157	0.033	0.000	-0.135	-0.013
	Ontario	0.0125	-0.416	0.172	0.000	-0.320	-0.292
	Manitoba	0.0010	-0.486	-0.115	0.000	-0.548	0.001
	Saskatchewan	0.0022	-0.554	0.481	0.399	-0.080	1.248
	Alberta	0.0050	-0.510	0.172	0.424	-0.186	0.486
	British Columbia	0.0036	-0.358	0.172	0.075	-0.194	-0.070

*P1977 × 100 = estimated percentage probability of migration from *i* to *j* given 1977 values of all explanatory variables in the migration equation, which is an estimate of the migration rate M_{ij}/N_i. Δ(variable) × 100 = percentage change in migration rate due to change from 1971 value to 1977 value in a variable, all other variables at 1977 levels. *UI* refers to *UIDEX*, *GU* to per capita equalization, *NRR* to per capita western resource revenues, (*UI, GU NRR*) includes all changes simultaneously, and *Y* refers to employment income. The absence of a destination implies that the corresponding probability is zero.

SOURCE Based on simulations performed by using equation VIII from Table 4-2.

Table 5-2

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Including Intra-Atlantic Moves, *PNTP* Income Class, 1968-77[*]

Origin (*i*)	Destination (*j*)	P1977	$\Delta(UI)$	$\Delta(GU)$	$\Delta(NRR)$	$\Delta(UI, GU, NRR)$	$\Delta(Y)$
Newfoundland	Nova Scotia	0.0042	0.385	0.095	0.000	0.513	0.093
	New Brunswick	0.0031	0.529	0.041	0.000	0.589	0.017
	Ontario	0.0126	0.021	-0.045	0.000	-0.027	-0.194
	Manitoba	0.0021	-0.091	0.109	0.000	0.005	0.012
	Alberta	0.0053	-0.131	-0.045	0.632	0.353	0.311
	British Columbia	0.0037	0.116	-0.045	0.106	0.179	-0.036
Nova Scotia	Newfoundland	0.0024	0.438	-0.083	0.000	0.314	-0.077
	New Brunswick	0.0046	0.555	-0.044	0.000	0.479	-0.064
	Quebec	0.0032	0.459	-0.063	0.000	0.361	-0.077
	Ontario	0.0109	0.038	-0.125	0.000	-0.095	-0.258
	Manitoba	0.0017	-0.076	0.017	0.000	-0.065	-0.069
	Saskatchewan	0.0020	-0.189	-0.228	0.592	-0.005	0.583
	Alberta	0.0049	-0.116	-0.125	0.631	0.260	0.206
	British Columbia	0.0031	0.134	-0.125	0.106	0.097	-0.113
New Brunswick	Newfoundland	0.0030	0.325	-0.037	0.000	0.270	-0.002
	Nova Scotia	0.0063	0.297	0.054	0.000	0.361	0.087
	Quebec	0.0149	0.344	-0.017	0.000	0.315	-0.003
	Ontario	0.0135	-0.043	-0.081	0.000	-0.125	-0.198
	Manitoba	0.0021	-0.149	0.068	0.000	-0.096	0.006
	Saskatchewan	0.0025	-0.253	-0.189	0.591	-0.039	0.710
	Alberta	0.0060	-0.186	-0.081	0.630	0.217	0.304
	British Columbia	0.0035	0.045	-0.081	0.105	0.060	-0.041

[*] See note to Table 5-1.

SOURCE Based on simulations performed by using equation VIII from Table 4-3.

Table 5-3

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Excluding Intra-Atlantic Moves, *MR* Income Class, 1968-77[*]

Origin (*i*)	Destination (*j*)	P1977	$\Delta(UI)$	$\Delta(GU)$	$\Delta(NRR)$	$\Delta(UI, GU, NRR)$	$\Delta(Y)$
Newfoundland	Quebec	0.00274	-0.0580	-0.068	0.000	-0.123	-0.001
	Ontario	0.00978	-0.0583	0.164	0.000	0.095	-0.149
	Manitoba	0.00131	-0.0585	-0.289	0.000	-0.330	0.005
	Alberta	0.00474	-0.0585	0.164	0.218	0.335	0.215
	British Columbia	0.00392	-0.0582	0.164	0.041	0.142	-0.030
Nova Scotia	Quebec	0.00245	-0.0574	0.246	0.000	0.173	-0.063
	Ontario	0.00913	-0.0578	0.556	0.000	0.464	-0.201
	Manitoba	0.00143	-0.0579	-0.049	0.000	-0.105	-0.057
	Saskatchewan	0.00252	-0.0581	1.345	0.206	1.663	0.392
	Alberta	0.00358	-0.0580	0.556	0.218	0.785	0.141
	British Columbia	0.00313	-0.0587	0.556	0.041	0.527	-0.089
New Brunswick	Quebec	0.00705	-0.0600	0.062	0.000	-0.003	-0.025
	Ontario	0.00940	-0.0604	0.326	0.000	0.245	-0.169
	Manitoba	0.00172	-0.0605	-0.190	0.000	-0.240	-0.019
	Alberta	0.00424	-0.0605	0.326	0.218	0.517	0.187
	British Columbia	0.00349	-0.0603	0.326	0.042	0.300	-0.053

[*] See note to Table 5-1.

SOURCE Based on simulations performed by using equation VIII from Table 4-2.

Table 5-4

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Including Intra-Atlantic Moves, *MR* Income Class, 1968-77*

Origin (*i*)	Destination (*j*)	P1977	Δ(*UI*)	Δ(*GU*)	Δ(*NRR*)	Δ(*UI, GU, NRR*)	Δ(*Y*)
Newfoundland	Nova Scotia	0.0035	0.238	−0.022	0.000	0.209	0.048
	New Brunswick	0.0031	0.244	−0.010	0.000	0.230	0.007
	Quebec	0.0035	0.240	−0.005	0.000	0.232	−0.001
	Ontario	0.0074	0.220	0.011	0.000	0.233	−0.115
	Manitoba	0.0020	0.213	−0.025	0.000	0.182	0.004
	Alberta	0.0042	0.211	0.012	0.272	0.559	0.160
	British Columbia	0.0031	0.225	0.012	0.051	0.303	−0.022
Nova Scotia	Newfoundland	0.0021	0.237	0.022	0.000	0.263	−0.047
	New Brunswick	0.0051	0.242	0.012	0.000	0.255	−0.039
	Quebec	0.0037	0.238	0.017	0.000	0.257	−0.047
	Ontario	0.0075	0.218	0.034	0.000	0.258	−0.156
	Manitoba	0.0020	0.212	−0.004	0.000	0.206	−0.042
	Saskatchewan	0.0022	0.204	0.067	0.257	0.614	0.286
	Alberta	0.0035	0.209	0.034	0.272	0.590	0.106
	British Columbia	0.0026	0.223	0.034	0.051	0.330	−0.067
New Brunswick	Newfoundland	0.0026	0.242	0.010	0.000	0.253	−0.013
	Nova Scotia	0.0065	0.241	−0.013	0.000	0.224	0.035
	Quebec	0.0090	0.243	0.005	0.000	0.248	−0.014
	Ontario	0.0091	0.223	0.022	0.000	0.249	−0.126
	Saskatchewan	0.0020	0.217	−0.016	0.000	0.196	−0.009
	Manitoba	0.0042	0.214	0.022	0.272	0.578	0.145
	British Columbia	0.0030	0.228	0.022	0.051	0.319	−0.035

*See note to Table 5-1.

SOURCE Based on simulations performed by using equation VIII from Table 4-3.

Thus it would appear that, at least for those in the *PNTP* group, the unemployment insurance system over the 1971/77 period had a quantitatively important and, on balance, retarding influence on migration out of the Atlantic region. At the same time, the unemployment insurance system also substantially encouraged migration within the Atlantic region, for both low-income and high-income groups.

With respect to the role of equalization (*GU*), the results of Tables 5-1 to 5-4 are somewhat ambiguous. The direction of the effect of equalization on rates of out-migration from the Atlantic provinces depends on which sample (including or excluding moves between the Atlantic provinces) is used in the simulation. The "best" results in terms of our *a priori* expectations (that is, those results in Table 5-2) show that equalization grants have reduced the migration of the *PNTP* group to all destinations outside the Atlantic region except Manitoba (which also receives substantial equalization payments). For example, in the case of out-migration to Ontario (the primary destination), the simulations indicate that the increase in equalization payments to the Atlantic provinces between 1971 and 1977 have had the effect of reducing the out-migration rates of the *PNTP* group by 5 to 13 per cent. The quantitative role of equalization is much less ambiguous in the case of migration to Alberta and British Columbia, as will be seen below.

The importance of western natural resource revenues (*NRR*) in stimulating out-migration from the Atlantic region can be clearly seen in Tables 5-1 to 5-4. The results of the simulations indicate that, in 1977, migration rates from the Atlantic provinces to Saskatchewan and Alberta for the *PNTP* group were between 40 and 65 per cent higher than they would have been had western natural resource revenues remained at their 1971 level. The corresponding increase for the *MR* group varies from 20 to 30 per cent approximately. In the *PNTP* case, these magnitudes rival in absolute value those for changes in the unemployment insurance system, though they are opposite in sign while, in the *MR* case, they are about four times larger than, and opposite in sign to, the effects (in Table 5-3) of the changes in the unemployment insurance system.

The second last column in Tables 5-1 to 5-4 gives the effect on out-migration from the Atlantic region of introducing simultaneously the three changes in the fiscal variables discussed separately above. When considered together as a package, the three fiscal changes seem on balance to have retarded out-migration of the poor from the Atlantic region to Ontario – the primary destination of migrants from this region. Rates of migration to Ontario for the *PNTP* group fall by between 10 and 30 per cent approximately, depending on the province of origin and sample (with or without intra-regional moves) used.[3] Rates of out-migration of the poor to resource-rich provinces like Alberta do not fall to the same extent and, in Table 5-2, they even increase substantially, by over 20 per cent. This increase reflects the attraction of natural resource revenues, as discussed previously.

In contrast to the retarding effect on the poor, the composite effect of the three fiscal changes is to substantially increase out-migration rates for the *MR* group, except to Manitoba. This partly reflects the quantitatively weak, retarding influence of the unemployment insurance system for this higher-income group.

Migration to Alberta and British Columbia

Let us turn now to the simulation results in Tables 5-5 and 5-6, which are based on equations for migration to Alberta and British Columbia from the rest of Canada. Only equations estimated without intra-regional moves in the sample have been used here, since fiscal variables did not perform well when intra-regional moves were included.

Except for the *MR* group moving westward from the Atlantic region or Quebec, these tables indicate that the migration-enhancing effects of unemployment insurance dominated its migration-retarding effects, especially for migration to British Columbia. This migration-enhancing effect complicates considerably the drawing of conclusions concerning the desirability of legislating regional variation in the unemployment insurance system. The migration rate for the *PNTP* group moving from Ontario (the primary origin) to Alberta and British Columbia increased by about 10 per cent and 20 per cent, respectively, and by about 2 per cent and 15 per cent, respectively, for the *MR* group, as a result of the regional variations in the unemployment insurance system that occurred between 1971 and 1977. Generally, the overall effect of unemployment insurance in stimulating migration is greatest for the low-income group across provinces of origin.

Combining these results with the previous results for out-migration from the Atlantic provinces suggests that the regional variations in the unemployment insurance system have on balance retarded out-migration from the Atlantic region to central

Table 5-5

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates to Alberta and British Columbia, *PNTP* Income Class, 1968-77*

Origin (*i*)	Destination (*j*)	P1977	Δ(*UI*)	Δ(*GU*)	Δ(*NRR*)	Δ(*UI, GU, NRR*)	Δ(*Y*)
Newfoundland	Alberta	0.0043	0.0196	-0.056	0.128	0.086	0.131
	British Columbia	0.0038	0.1102	-0.056	0.025	0.075	-0.019
Nova Scotia	Alberta	0.0047	0.0192	-0.148	0.127	-0.022	0.089
	British Columbia	0.0043	0.1097	-0.148	0.025	-0.032	-0.056
New Brunswick	Alberta	0.0048	-0.0033	-0.100	0.127	0.012	0.116
	British Columbia	0.0045	0.0852	-0.100	0.025	0.001	-0.033
Quebec	Alberta	0.0018	0.0181	-0.089	0.128	0.058	0.132
	British Columbia	0.0015	0.1086	-0.089	0.025	0.047	-0.019
Ontario	Alberta	0.0061	0.0978	0.000	0.127	0.234	0.244
	British Columbia	0.0049	0.1953	0.000	0.025	0.221	0.078
Manitoba	Alberta	0.0140	0.1309	-0.157	0.125	0.070	.124
	British Columbia	0.0087	0.2313	-0.157	0.023	0.059	-0.026
Saskatchewan	Alberta	0.0261	0.1651	0.150	0.011	0.355	-0.120
	British Columbia	0.0133	0.2685	0.150	-0.081	0.340	-0.237

*See note to Table 5-1.

SOURCE Based on simulations performed by using equation X from Table 4-5.

Table 5-6

The Effects of Selected Changes in Fiscal Structure on Out-migration Rates to Alberta and British Columbia, *MR* Income Class, 1968-77*

Origin (*i*)	Destination (*j*)	P1977	Δ(*UI*)	Δ(*GU*)	Δ(*NRR*)	Δ(*UI, GU, NRR*)	Δ(*Y*)
Newfoundland	Alberta	0.0033	-0.101	-0.020	0.103	-0.028	0.333
	British Columbia	0.0032	0.010	-0.020	0.020	0.010	-0.042
Nova Scotia	Alberta	0.0033	-0.095	-0.055	0.103	-0.057	0.219
	British Columbia	0.0031	0.016	-0.055	0.020	-0.020	-0.124
New Brunswick	Alberta	0.0040	-0.129	-0.036	0.103	-0.074	0.306
	British Columbia	0.0036	-0.022	-0.036	0.020	-0.038	-0.062
Quebec	Alberta	0.0011	-0.105	-0.028	0.103	-0.041	0.334
	British Columbia	0.0009	0.005	-0.028	0.021	-0.003	-0.042
Ontario	Alberta	0.0029	0.023	0.000	0.103	0.128	0.677
	British Columbia	0.0024	0.149	0.000	0.020	0.172	0.205
Manitoba	Alberta	0.0112	0.071	-0.059	0.101	0.110	0.314
	British Columbia	0.0068	0.203	-0.059	0.019	0.153	-0.056
Saskatchewan	Alberta	0.0188	0.127	0.051	0.007	0.193	-0.242
	British Columbia	0.0085	0.265	0.051	-0.068	0.240	-0.456

*See note to Table 5-1.

SOURCE Based on simulations performed by using equation X from Table 4-5.

Canada, while they have tended to encourage outflows from central Canada to Alberta and (especially) British Columbia. Moreover, the magnitude of these effects is much greater for the low-income *PNTP* group than for the higher-income *MR* group.

Parenthetically, an interesting comment on the migration-enhancing effect of the unemployment insurance system follows from the observation that British Columbia can be regarded as a (relatively) high-wage, high-unemployment region. For, if this characterization is appropriate, the positive effect of unemployment insurance on migration to British Columbia noted above suggests that this migration flow has some of the important characteristics of the migration of the rural poor to high-wage, high-unemployment urban centres in underdeveloped countries, as analysed by Todaro (1969).

While the estimated impact of the increase in equalization payments from 1971 to 1977 is ambiguous in the case of out-migration from the Atlantic provinces, it is much clearer in the case of migration to Alberta and British Columbia. The results of the simulations in Tables 5-5 and 5-6 show that the increase in equalization payments between 1971 and 1977, which to a large extent was the result of a rise in western natural resource revenues, resulted in a reduction in migration rates to Alberta and British Columbia of between 6 and 16 per cent for the *PNTP* group, and between 2 and 6 per cent for the *MR* group, depending on the province of origin.

With respect to the role of western natural resource revenues, the simulations for migration from the rest of Canada to Alberta and British Columbia show that the fiscal benefits financed by natural resource revenues have attracted persons from both income groups. Had western natural resource revenues remained at their 1971 level, migration rates to Alberta and British Columbia would have been lower than they were in 1977, according to the simulations. For example, the rate of migration to Alberta by those in the *PNTP* group is increased by about 13 per cent as a result of the increase in western natural resource revenues. The corresponding rate of increase for the *MR* group is about 10 per cent.

When all three fiscal changes are considered simultaneously (see the second last column in Tables 5-5 and 5-6), it would appear that with respect to migration from central Canada to Alberta and British Columbia, the retarding influence of unconditional grants is generally outweighed by the migration-enhancing effects of unemployment insurance and natural resource revenues. The increase in the rate of migration from Ontario to Alberta is around 23 per cent for the *PNTP* group and about 13 per cent for the *MR* group. For Atlantic origins, however, the combined effects of fiscal structure on out-migration are less positive or even negative, particularly for the *MR* group.

A Comparison of the Relative Influence of Public and Private Economic Factors Affecting Interprovincial Migration

To complete the analysis, simulations on the quantitative importance of regional variations in employment incomes were also undertaken in order to provide a standard against which the strength of the effects of fiscal structure may be judged. These simulations, presented in the last column of Tables 5-1 to 5-6, indicate how the evolution of regional differences in expected employment income between 1971 and 1977 may have affected interprovincial migration.[4]

In the case of migration to Alberta and British Columbia (Tables 5-5 and 5-6), the simulations show that employment income was generally more important (in absolute value) than fiscal structure as a whole in explaining recent migration trends. The simulations also show that, both absolutely and relative to the influence of fiscal structure, employment income variations were quantitatively more important to the *MR* group than to the lower-income *PNTP* group. For example, the simulated change in the rate of migration from Ontario to Alberta due to employment income variations alone is about 68 per cent for the *MR* group and about 24 per cent for the *PNTP* group, while the combined effects of variations in fiscal structure for these groups are approximately 13 and 23 per cent, respectively. Such results clearly reinforce the conclusion in Chapter 4 that fiscal structure generally matters more to lower-income individuals.

The effects of employment income differentials in the case of out-migration from the Atlantic provinces in Tables 5-1 to 5-4 are quite complex, and it is difficult to make generalizations. However, results for the *MR* group in Tables 5-3 and 5-4 do not appear to exhibit the same (greater) importance for variations in expected employment income relative to the combined effects of fiscal structure as do the results in Table 5-6 (see, for example, Nova Scotia to British Columbia). Thus we can say that the impression given by a comparison of the results in Tables 5-3, 5-4, and 5-6 concerning the *MR* group is that differential fiscal structure was of greater importance relative to the effects of employment income differentials in determining out-migration from the Atlantic provinces than it was in determining in-migration to Alberta and British Columbia.

For the *PNTP* group, Tables 5-1 and 5-2 indicate that fiscal structure as a whole tends to dominate the effect of employment income differentials, except when the destination is Saskatchewan or Alberta. Thus together Tables 5-1, 5-2, and 5-5 suggest that, for the *PNTP* group, fiscal structure as a whole was of greater importance relative to employment income differentials in determining migration from the Atlantic region to central Canada than it was in determining migration to provinces west of Manitoba.[5]

6 Summary and Concluding Remarks

The estimation in Chapter 4 together with the simulations in Chapter 5 indicate that fiscal structure does influence interprovincial migration decisions, and that it generally influences low-income individuals to a greater extent than those in the middle and rich-income groups. In view of the paucity of evidence on the extent and nature of fiscally induced migration in Canada, these results represent a substantial addition to our knowledge concerning the influence of the public sector on interprovincial migration.

A finding that fiscal structure has a relatively greater migration impact on low-income than on high-income individuals is intuitively plausible, as was pointed out in Chapter 4, for the reason that net fiscal benefits are likely to constitute a higher proportion of the comprehensive income of low-income people. The plausibility of this aspect of our results strongly suggests that the statistical significance of fiscal structure in the results as a whole is not simply a consequence of spurious correlation, even though each fiscal variable did not always perform as expected in every migration flow considered.

The results also indicate that the migration impact of fiscal structure varies systematically with the geographical composition of the migration flows considered. For example, fiscal variables performed much better (in terms of the sign and significance of coefficients) in explaining out-migration from the Atlantic region and in-migration to Alberta and British Columbia than they did in explaining migration in the opposite directions. We have attributed this to a combination of factors, including the relatively greater proportion of return migrants in migration flows to the Atlantic region and from Alberta and British Columbia to the rest of Canada, and the uneven statistical performance across migration flows of aggregate data as a proxy for micro observations on net fiscal benefits. Confirmation of this regional variation in our results remains an interesting topic for future research.[1] It may well be that improvements in measuring net fiscal benefits will result in a significant role for fiscal structure across all possible regions of origin or destination, in much the same way that a measure of expected employment income based on the micro tax data resulted, in Chapter 4, in much better performance of this migration determinant across regions than did the use of provincial income aggregates in Chapter 2.

The above conclusions are based on an approch to the modelling of fiscally induced migration that was developed in Chapters 2 and 3.

The intermediate model in Chapter 2, lying between that of Courchene (1970) and the modified MNL model of Chapter 3, consisted of Courchene's equations amended via an extension of Todaro (1969) to incorporate a theoretically more satisfactory treatment of unemployment insurance. The modelling of the migration impact of unemployment insurance is more satisfactory because it incorporates differential fiscal structure, in contrast to Courchene's approach, which was to use only origin values of fiscal variables in an estimating equation. Estimation based on this intermediate model supports the general conclusion that fiscal structure matters. In particular, this estimation indicates that the 1971 revisions to the Unemployment Insurance Act, which introduced regional variation in unemployment insurance generosity, had the expected effects of both reducing and increasing out-migration from the Atlantic provinces. Parenthetically, it is also worth noting that the estimation using a revised family allowance migration series in Chapter 2 confirms Courchene's (1970) statistical conclusions that migration is retarded by equalization and transfers (other than unemployment insurance) to persons, at least in the case of out-migration from the Atlantic region.

The theoretical developments in Chapter 3 were primarily centred around the difficult problem of using aggregate fiscal data to represent the net fiscal benefits, in both origin and destination, that are relevant to individual migration decisions. In this respect, we have placed heavy reliance upon the disaggregation by income class of a new migration series, which we have been able to construct from federal income tax files.

The conclusion that fiscally induced migration exists cannot by itself resolve the policy debate that has been concerned with the equity-efficiency trade-off in the regional dimension, a debate which played an important role in motivating this study, and which suggested some of the basic elements of the econometric model developed here. But it does indicate that this debate is relevant, which is a modest but not unimportant conclusion in its own right. For, if decisions to migrate from one province to another in fact were not influenced by differences in fiscal benefits across provinces, it is apparent that these differences would not be a matter of concern from the viewpoint of economic efficiency. In that case, policy with respect to these differences could be formulated on equity grounds alone.

To those concerned predominantly with the equity-efficiency trade-off, three of the detailed results of this study may be of particular interest.

The first is the finding that the expectation of fiscal benefits fueled by natural resource revenues does increase the odds of migration to the west, especially for low-income individuals, and the second is the finding that equalization reduces these same odds. Hence, taking the Graham/Boadway/Flatters view of the equity-efficiency trade-off, it could be said that the equalization program is doing what it is supposed to. Equalization grants do retard migration to the west, which does not represent the movement of factors of production to their socially most productive location. Moreover, to continue with this view, it should be noted that the manner in which natural resource revenues are to enter the equalization formula will, in the light of the same evidence, have significant efficiency as well as equity repercussions, which should be considered.

The third result of particular interest is our finding that the unemployment insurance system does on balance retard out-migration from the Atlantic provinces to the rest of Canada, again especially for low-income individuals.[2] Thus, if one accepts the transfer dependency thesis as developed by Courchene, this result indicates that the place-oriented nature of the regional variation in the unemployment insurance system is at least partly responsible for the relatively low employment incomes in the Atlantic provinces.

It is beyond the scope of this study to compute the magnitude of the efficiency repercussions of fiscally induced migration, which were referred to above. However, since the simulations in Chapter 5 suggest that the quantitative impact of fiscal structure on internal migration may not be trivial (relative to the role of income differentials), it is probably worth while that such calculations be attempted.[3]

Appendixes

A Definition of Variables Used in Estimating Equations and Sources of Data

Variable	Definition	Source
AC	Number of family allowance active accounts (units).	Family allowance file supplied by Charles B. Walker of Health and Welfare Canada.
ALL	Refers to "all" income class (see Appendix C).	
AUI	Average unemployment insurance weekly payments (dollars).	*Statistical Report on the Operation of the Unemployment Insurance Act*, Statistics Canada, cat. no. 73-001.
AWW	Average weekly wages and salaries, industrial composite (dollars).	*Employment, Earnings, and Hours*, Statistics Canada, cat. no. 72-002.
C	Constant term.	
D	Trans-Canada road distance between major cities of each province (miles).	Canada highway map, Canadian Government Travel Bureau, 1966.
D(.)	Destination value minus origin value of the log of the variable in the parentheses.	
E	Number of persons employed (thousands of persons).	"Provincial Seasonally Adjusted Labour Force Statistics, January 1953 to December 1965," Statistics Canada, Working Paper No. 2, and *Historical Labour Force Statistics*, Statistics Canada, cat. no. 71-201.
ΔE	Employment growth over the previous year (thousands of persons).	
ED	Education, percentage of population 5 years and older with some university schooling but not attending school full time (percentage).	*Census of Canada, 1951, 1961, 1971, 1976*, Statistics Canada, cat. nos. 92-550, 92-720, 92-827.
FMAC	Interprovincial transfer of family allowance accounts (units).	Constructed by the authors from family allowance file supplied by Charles B. Walker of Health and Welfare Canada.
FMP	Total interprovincial migration of persons (units).	Constructed by the authors.
GF	Federal purchases: sum of federal nonwage, nondefence current purchases of goods and services; federal gross capital formation; the corporate part of federal capital assistance; and the agriculture component of federal current subsidies (thousands of dollars).	Unpublished provincial accounts data supplied by Joel Dienna, Brenda Collier, and Don Finnerty of Statistics Canada.

(cont'd)

Variable	Definition	Source
GU	Unconditional grants: sum of equalization payments; the statutory subsidies set out in the British North America Act; Atlantic Provinces Adjustment Grants; and (in the 1970s) the revenue guarantee from the federal government to the provinces (thousands of dollars).	Lynn (1964), and unpublished summaries of federal payments to the provinces, Department of Finance, Ottawa.
HP	Comparable provincial housing price index (Canadian average in 1971 = 100).	Constructed by the authors from data on average transactions price of properties processed by Multiple Listing Services supplied to us by Ken Norrie of the University of Alberta.
L	Number of persons in the labour force (thousands of persons).	"Provincial Seasonally Adjusted Labour Force Statistics, January 1953 to December 1965," Statistics Canada, Working Paper No. 2, and *Historical Labour Force Statistics*, Statistics Canada, cat. no. 71-201.
M	Refers to "middle" income class (see Appendix C).	
MR	Refers to "middle/rich" income class (see Appendix C).	
N	Population (thousands of persons).	*Estimates of Population for Canada and the Provinces*, Statistics Canada, cat. no. 91-201.
NRR	Natural resource revenues: sum of provincial indirect taxes from the resource sector, and net profits of resource-related provincially owned crown corporations (thousands of dollars).	*Consolidated Government Finance*, Statistics Canada, cat. no. 68-202, and *Provincial Government Enterprise Finance*, Statistics Canada, cat. no. 61-204.
PNT	Refers to "poor-without-tax" income class (see Appendix C).	
$PNTP$	Refers to "poor" income class (see Appendix C).	
PT	Refers to "poor-with-tax" income class (see Appendix C).	
R	Refers to "rich" income class (see Appendix C).	
RP	Comparable regional price index of major cities of each province (Canadian average in 1971 = 100).	Constructed by the authors from data in, Economic Council of Canada, *Living Together: A Study of Regional Disparities* (Ottawa: Supply and Services Canada, 1977); and *Prices and Price Indexes*, Statistics Canada, cat. no. 62-002.
S_1	Dummy variable: $S_1 = 1$ if the move is from any Atlantic province to Ontario or from New Brunswick to Quebec; otherwise $S_1 = 0$.	
S_2	Dummy variable: $S_2 = 1$ if the move originates from Quebec; otherwise $S_2 = 0$.	
S_3	Dummy variable: $S_3 = 1$ if the move is from Saskatchewan to Alberta; otherwise $S_3 = 0$.	
TRF	Federal transfer payments to persons (thousands of dollars).	*System of National Accounts: Provincial Economic Accounts*, Statistics Canada, cat. no. 13-

(concl'd)

Variable	Definition	Source
		213; and *System of National Accounts: National Income and Expenditure Accounts*, Statistics Canada, cat. no. 13-531. Some data for early 1950s supplied by Barbara Clift of Statistics Canada.
TRF2	Federal transfer payments to persons less unemployment insurance benefits: primarily family allowances and old age security payments (thousands of dollars).	*System of National Accounts: Provincial Economic Accounts*, Statistics Canada, cat. no. 13-213; *System of National Accounts: National Income and Expenditure Accounts*, Statistics Canada, cat. no. 13-531; and *Statistical Report on the Operation of the Unemployment Insurance Act*, Statistics Canada, cat. no. 73-001.
T2	Dummy variable: $T2 = 0$ for the first half of the time period studied; and $T2 = 1$ for the second half of the time period studied.	
T3	Dummy variable: $T3 = 0$ for any year prior to 1972; and $T3 = 1$ from 1972 on.	
U	Provincial unemployment rate: $U = (L - E)/L$.	Constructed by the authors.
$\overline{U}$	Canadian unemployment rate: $\overline{U} = (\overline{L} - \overline{E})/\overline{L}$.	Constructed by the authors.
UI	Total of unemployment insurance benefits paid (thousands of dollars).	*Statistical Report on the Operation of the Unemployment Insurance Act*, Statistics Canada, cat. no. 73-001.
UIDEX	Measure of generosity of the unemployment insurance program: it is equal to the maximum number of weeks for which a person having the minimum number of weeks of employment to qualify for unemployment insurance benefits can draw those benefits divided by the minimum period of employment needed to qualify, then multiplied by the ratio of unemployment insurance claims accepted to total unemployment insurance claims.	Data supplied by Pierre Fortin of Laval University; and *Statistical Report on the Operation of the Unemployment Insurance Act*, Statistics Canada, cat. no. 73-001.
Y	Measure of expected employment income (dollars): $Y_{j,t} = \frac{YA_{i,t-1}}{YS_{i,t-1}} \cdot YS_{j,t}$ $Y_{i,t} = \frac{YA_{i,t-1}}{YS_{i,t-1}} \cdot YS_{i,t}$ where YA = average employment income of migrants from province i to province j. YS = average employment income of stayers. t = the year of the move.	Constructed by the authors from data supplied by John Leyes, Doug Norris, and Nelson Kopustas of Statistics Canada.
YL	Total labour income (thousands of dollars).	*Estimates of Labour Income*, Statistics Canada, cat. no. 72-005.

NOTE Subscripts *i* and *j* refer respectively to the province of origin and the province of destination. All variables deflated by Canadian consumer price index (1971 = 100) where appropriate. No responsibility for the way in which data have been used is to be attached to those people named as sources.

B The Family Allowance Data Revision and Calculation of the Total Migration Series

Interprovincial Family Allowance Migration

Until 1973 inclusively, only those children between 0 and 15 complete years of age who were attending school and whose parents were Canadian citizens or landed immigrants of one year standing were eligible for family allowances. Since January 1, 1974, the recipient of family allowance payments has had to be under 18 years of age and with at least one parent who is (a) a Canadian citizen, (b) a landed immigrant, or (c) a nonimmigrant who has been allowed entrance into Canada under statutorily prescribed circumstances for a period of at least one year. Furthermore, the child must be wholly or substantially maintained by a parent. A family allowance cheque is mailed each month to every family entitled to receive such payments. A family who moves must notify the regional office of Health and Welfare Canada of its change of address if it wishes to continue receiving family allowance cheques at its new address. This information is used by each regional office to compile monthly tables showing, by province of origin and destination, the number of families who have moved. It should be remembered that these data represent only migrant families with children eligible for family allowances. Furthermore, they do not give the total number of moves in a particular month, but only the number of changes of address compiled during that month. It appears that there is a time lag of approximately two months between the date of moving and the date of compilation of the move.[1]

Revision of the Family Allowance Data

The revisions that we have made to the family allowance migration series are threefold:

- Using the original data sheets on interprovincial transfers of family allowance accounts supplied to us by Charles Walker of Health and Welfare Canada, we have extended the series back to 1950. The series published by Statistics Canada in its catalogue number 91-208 begins with data for 1961.
- Prior to May 1968, the Department of National Health and Welfare compiled for each province both the number of accounts sent to another province as well the number of accounts received from another province. Originally, Statistics Canada used the number of accounts sent to another province in estimating interprovincial migration but, starting in May 1968, they had to resort to the number of accounts received, since the former series was no longer available. Our revised series is consistently based on accounts received by a province rather than on accounts sent to a province. Although the two series are similar in the long run, the former (accounts received) is more likely to reflect a move that has been made, since an account is registered as received when it is reactivated.
- The annual gross migration data published before 1979 by Statistics Canada are on a June-to-May basis.[2] Since all our other data are on a calendar-year basis, we have computed a family allowance migration series on the same basis using the appropriate monthly observations.

Calculation of the Total Migration Series

The method that we utilized to estimate gross flows of interprovincial migration of persons (*FMP*) is the same as that used by Statistics Canada.[3] It consists of the following equations:

$$\text{(B.1)}\quad M^{e}_{i,j} = FMAC_{i,j} \cdot \overline{X}'_{i}$$

$$\text{where } \overline{X}'_{i} = \overline{X}_{i} \cdot c_{i}.$$

$$\text{(B.2)}\quad M^{a}_{i,j} = \frac{M^{e}_{i,j}}{P^{e}_{i}} \cdot F_{i} \cdot P^{e}_{i}.$$

$$\text{(B.3)}\quad FMP_{i,j} = M_{i,j}^{e} + M_{i,j}^{a}.$$

where

$FMAC_{i,j}$ = number of family allowance active accounts transferred between provinces *i* and *j* (received by province *j*);

$\overline{X}_i$ = provincial average of number of children per family eligible for the allowance in province *i*;

c_i = ratio for province *i* of number of children per migrant family to number of children per family eligible for family allowance in 1975;

$\overline{X}_i'$ = average number of children per migrant family eligible for family allowance in province *i* (estimate for the period 1950-73 and actual number from 1974 on);

$M_{i,j}^{e}$ = estimate of number of children who moved from province *i* to province *j*;

$M_{i,j}^{a}$ = estimate of number of adults who moved from province *i* to province *j*;

$FMP_{i,j}$ = estimate of total number of out-migrants from province *i* to province *j*;

F_i = adjustment factor for province *i* (this is the ratio of adult to child out-migration rates as derived from 1971 and 1976 census figures. The 1971 values have been applied to data covering the period 1950-73, whereas the 1976 values of F_i have served in the calculation covering the period 1974-1978);

P_i^{e} = number of children in province *i* (from 1950 to 1973, P_i^{e} refers to the number of persons between 0 and 15 complete years of age and, from 1974 on, P_i^{e} refers to the number of persons under 18 years of age); and

P_i^{a} = number of adults in province *i* (from 1950 to 1973, P_i^{a} refers to the number of persons 16 years of age or older and, from 1974 on, P_i^{a} refers to the number of persons 18 years of age or older).[4]

After appropriate substitution, equation (B.3) can also be written as:

$$\text{(B.4)}\quad FMP_{i,j} = (FMAC_{i,j} \cdot \overline{X}_i \cdot c_i)\left(1 + F_i \cdot \frac{P_i^{a}}{P_i^{e}}\right).$$

The total interprovincial migration estimates resulting from the application of expression (B.4) are very much dependent on the values of the adjustment factor F_i and the ratio c_i. Since values of F_i were only available for the Census years 1971 and 1976, we used the 1971 values for estimation of interprovincial migration between 1950 and 1973. There is no doubt that this procedure yields estimates somewhat more fragile for the beginning of the time period considered. Moreover, since the number of children per migrant family $\overline{X}_i'$ is known after 1973, it is likely that our estimates of total interprovincial migration are becoming more reliable as the time period considered evolves.

Due to space limitations, the *FMAC* and *FMP* migration series are published separately from this study in the data supplement referred to in the Preface.

C The Tax Data Migration Series

The interprovincial migration equations of Chapter 4 were estimated using migration data derived from a 10 per cent longitudinal tax file supplied by John Leyes, Doug Norris, and Nelson Kopustas of Statistics Canada.[1]

The master data bank from which the Tax Data Migration Series was constructed consists of a longitudinal 10 per cent sample (all social insurance numbers ending in 5) of all federal personal income tax returns filed between 1967 and 1977. Confidentiality requirements attached to the use of this data allow only totals or averages over individual files to be released, and then only when there are at least six files involved in the computation.

Exclusions from the Master Data Bank

Given the necessity of working with grouped data, it is important to ensure that each "cell" of data (in the form of totals and averages) pertains to a group of fairly homogeneous individuals.

For this reason, the following individual files were excluded from the master data base:

- individuals whose taxation province is Yukon, Northwest Territories, outside Canada, in multiple jurisdictions, or not in existence;
- immigrants, emigrants, deceased;
- individuals whose main source of income is from rentals or investments;
- individuals under 20 years old or over 55 years old;
- single individuals paying tuition fees in excess of $300 a year, considered to be full-time students;
- married women with annual total income less than one-half the upper income level of the poor income class, as defined below. (In this case, it is assumed that the wife's economic status would not play a major role in the migration decision); and
- individuals with annual total income less than $100.[2]

The resulting sample thus consists of individuals of prime working age, whose major source of income is either employment (or self-employment) earnings or transfer payments. To illustrate the number of files in this reduced sample, we note that the Department of National Revenue reports 8,495,184 persons who filed a tax return in 1968. A 10 per cent sample would therefore yield 849,518 files. After all of the above exclusions have been carried out, our reduced sample in 1968 contains 461,147 files, which represents 54.3 per cent of all files in the 10 per cent sample.

Although there is a vast amount of information contained in the tax returns by which to classify tax filers, making use of all of it would have pushed us beyond the confidentiality limits given above, and would have resulted in a large number of empty mobility cells (of less than six files). For this reason, for example, we used only a broad age group (20 to 55 years inclusive) rather than a more narrowly defined set of age groupings, choosing instead to disaggregate tax filers in greater detail by income class in the manner described below.

Interprovincial Migration Definition

By appropriately matching social insurance numbers on tax returns, it was possible, for each taxation year, to classify tax filers as either interprovincial migrants or stayers, according to their province of residence on December 31. Where the provinces of residence for two successive years were different, the individual was recorded as a migrant for the year in which the move had occurred. Where the province of residence for two successive years was the same, the individual was recorded as a stayer. Then, for each income class, the number of individuals, the average of their employment incomes and other variables of interest were tabulated for each province-of-origin/province-of-destination pair (the destination being the same as the origin in the case of stayers).

Disaggregation by Income Class

One of the main advantages of an interprovincial migration series based on tax files is that it can be disaggregated by income class. We have constructed interprovincial migration series for the following seven income classes.

PNT: $100 to $10,000 paying no tax;
PT: $100 to $10,000 paying taxes;
PNTP: $100 to $10,000;
M: $10,001 to $20,000;
R: $20,001 or more;
MR: $10,001 or more; and
ALL: $100 or more.

Here *P* refers to "poor," *NT* to "no tax," *M* to "middle," and *R* to "rich."

The income levels referred to are total incomes (as on the tax return) in 1977 constant dollars, in the year of the interprovincial move. More precisely, given that an individual was judged to have moved from province *i* to province *j* during a given year, that individual was placed in the appropriate origin/destination-specific income class for that year, based on his or her total income in the destination *j*.

It should be noted that the *PNTP*, *MR*, and *ALL* income classes were constructed by reading through all the files again and not simply by adding up the constituent income groups. Thus, for example, if there were only three individuals in a particular cell of the mobility matrix for the *PNT* income group and four individuals in the corresponding cell of the *PT* income group, those two cells would show up as empty, given the confidentiality requirements. By adding them up, we would also get an empty cell for the corresponding cell of the *PNTP* income group. On the other hand, a new reading of all the files with specifications concerning the *PNTP* income class would permit us to identify the migration of those seven individuals.

The tax data migration series are listed in the data supplement to this study referred to in the Preface.

Notes

CHAPTER 1

1 We should also note that there is another solution to the problem of horizontal fiscal imbalance besides intergovernmental grants, which is usually thought to be politically unfeasible. That is to have a system of federal tax rates that vary across regions.

2 See *The Canadian Constitution* (Canada, Government, 1980), Section 31(1). For a general discussion of the Canadian equalization system, see Boadway (1980).

3 Scott (1952, 1964) has also questioned the desirability of maintaining horizontal fiscal balance in a federation of semi-autonomous provinces. Usher (1980) has attacked the concept as without justification in a country that permits at the same time interregional variation in private expenditure.

4 On the equalization implicit in the conditional grant system, see Young (1977).

5 For a general description of the unemployment insurance system in Canada including the post-1971 regional variation in the unemployment insurance benefit payout period, see CCH Canadian Limited (1977 and updates). See also Rea (1977).

6 See also Buchanan and Goetz (1972) and Flatters, Henderson, and Miezskowski (1974). These authors provide an efficiency rationale for equalization in the presence of migration-related externalities. The Graham and Boadway/Flatters arguments do not require these externalities.

7 Horizontal equity in the federal tax system and horizontal fiscal balance are not, in general, identical objectives. The latter, as defined above, includes the stipulation that public services be equally available on a per capita basis everywhere in the country. However, in their analysis, Boadway and Flatters assume that provincial fiscal systems distribute services on an equal per capita basis and that provincial taxation is proportional. Given this characterization of the provincial fiscal system, their objective of horizontal equity in the federal tax system is essentially equivalent to Graham's objective of horizontal fiscal balance in the federation.

8 Strictly speaking, as Boadway and Flatters note, this sort of equalization must eliminate all interprovincial differences in individual net fiscal benefits. But neither Graham nor Boadway and Flatters actually argue for equalization of individual fiscal benefits. Like the Rowell-Sirois Commission, they advocate that all such equalization payments be made to provinces. The reason for payments to provinces rather than to individuals is that these authors wish to maintain the fiscal autonomy of provincial governments, which is thought necessary for a viable federal system. (Boadway and Flatters state this explicitly, but it is implicit in the other views as well.) Equalization by the federal government based on individual net fiscal benefits would effectively eliminate the ability of provinces to discriminate fiscally among provincial voters. Such equalization would therefore effectively eliminate any federal dimension to the Canadian fiscal system.

9 Gainer and Powrie (1975) have made a similar suggestion.

10 It can also be argued that fiscally induced migration is important in defining civil liberties and the nature of the national polity. In this extended note, we discuss the reasons why this is so. This discussion has not been included in the main text, because it does not provide any immediately useful background to the formulation of estimating equations. Nevertheless, the issues involved are interesting and important.

Following Hirschman (1970), we can say that there are basically two ways an individual can enforce his rights as a citizen *vis à vis* government. One is to voice displeasure with government actions via the political process within the jurisdiction in which the individual lives. The other is to exercise or threaten to exercise exit, that is, to leave the jurisdiction of the offending government. In highly centralized unitary states, choosing the exit option is to a much greater extent an all-or-nothing decision. Changing governments means international migration to a different society with different professional standards, business practices, and attitudes. In a federal country, the existence of diverse, relatively autonomous jurisdictions makes the exercise of the exit option cheaper in many cases (Brennan and Buchanan, 1980, and West and Winer, 1980). The physical distance moved may be even larger, but qualifications, financial assets, and even the accustomed standard of national public services remain the same. In this way, interprovincial and intermunicipal migration may be important determinants of the proper relationship between the citizen and the state in Canada, preventing government from exercising undue influence over the lives of individual citizens on behalf of special interest groups. Such migration may take a decade or more to make itself felt in this respect, but nonetheless may well be a fundamental determinant of the responsiveness of government to the demands of citizens.

In this view of the political market place, if migration in response to variation in fiscal structure across the country is low because migration costs are high, the possibilities for coercion via provincial or municipal public sectors are enhanced. French-speaking people in Quebec who have a cultural preference for remaining there, for example, are more likely to be subject to coercion exercised through the Quebec public sector than the relatively more mobile Anglophone population, because cultural preference makes the indirect cost of migration very high. (It is appropriate to note here that Quebec personal income tax rates are the highest in the country.) Similarly, where location-specific resource (or other) rents exist, as in Alberta, the benefits of which individuals are reluctant to forego, we may observe more coercion exercised via the public sector, since such coercion may not precipitate out-migration to the same extent as in provinces where location-specific rents do not exist.

It is implicit in the above view of the virtues of federal structure that intergovernmental fiscal arrangements carry with them the danger of collusion between governments to regulate or control migration in the particular interests of powerful groups. It has been suggested by Breton and Scott (1978, p. 124), for example, that equalization paid to the Atlantic provinces might be viewed as an exchange arranged by the federal government between the governments of Ontario, Alberta, and British Columbia on one hand, and those of the Atlantic provinces on the other, on behalf of certain politically powerful groups. Ontario may not want internal immigration from the poorer provinces, since this is inimical to the interests of resident unionized factor suppliers. (International migration can be controlled to a greater extent via the province's influence on both the total number, and, by way of the immigration point system, on the skill mix of international migrants, and thus does not pose as serious a threat as uncontrolled internal migration.) Also the Atlantic provinces may want to finance subsidies that maintain the profitability of firms in declining sectors, and hence sustain employment (Migué, 1977), or reduce actual or potential taxes paid by high-income groups, so as to retain their richer taxpayers (Breton and Scott, 1978). In these ways, intergovernmental transfers could enhance the ability of governments to successfully service special interests at the expense of the general taxpayer.

But, if one of the virtues of the federal system is the relative ease with which exit can be used, then arrangements between governments that make them less competitive may have a social cost that cannot easily be computed in terms of economic efficiency as usually defined. This cost would reflect the resulting reduction in the usefulness of threatened or actual exit as a means of maintaining the proper relationship between the individual citizen and the state. Thus Bélanger (1981) has recently concluded that tax harmonization should not be on the agenda at federal-provincial conferences, because this threatens to diminish intergovernmental competition in Canada.

The idea expressed above that the behaviour of the state is potentially harmful and, hence, that citizens must be careful to maintain institutions that help to enforce "correct" behaviour is not the only basis upon which to judge public policies having migration implications. One of the alternative views of great importance in the Canadian context is that maintenance of a stable and legitimate national polity does and should require the Canadian state to protect the demographic viability of historically defined regional socio-economies, such as those of Quebec or Newfoundland (see, for example, Bird, 1979). In this view, at least some intergovernmental and personal transfers are supposed to inhibit out-migration from declining regions, by counteracting the economic forces that have initially led to regional decline. This may result in economic inefficiency in the narrow sense used by participants in the Courchene-Graham debate, or even in social losses stemming from collusion between governments, as discussed immediately above but, in this view, such losses, if they occur, are simply the price that society has to pay for defence of a stable and legitimate national policy.

11 Courchene would probably put a third relationship on the research agenda. This is the relationship between the transfer system and provincial policies with respect to private economic activity.

12 The internal migration flows reported in these figures and in Table 1-1 are based on family allowance data. See Appendix B. It is of interest to note that Alberta, which had the highest rates of gross in-migration in the 1970s of any province, also had the largest gross out-migration rates. This positive correlation of gross in-migration and gross out-migration rates is not an unusual phenomenon (see, for example, the survey by Greenwood, 1975, p. 413).

13 The province of Prince Edward Island is excluded here (and in subsequent tables). Generally, Prince Edward Island will also be excluded from samples used in the empirical work reported in subsequent chapters because of the difficulty of obtaining certain data for this very small province.

CHAPTER 2

1 See Courchene (1970, Table VI, p. 570).

2 Ibid. (Table I, p. 562).

3 There has been some recent preliminary work on the role of certain fiscal variables in determining migration to and from Newfoundland by Boadway and Green (1980). Termote and Fréchette (1979) have considered the role of grants provided by the Department of Regional Economic Expansion in explaining interprovincial migration flows. Cousineau (1979) has examined the effect of unemployment insurance on migration flows between Ontario, Nova Scotia, and New Brunswick. However, none of these authors provide a

systematic evaluation for all provinces of the relationship between major fiscal instruments (as in Courchene) and interprovincial migration.

4 Courchene (1970, Table VI, p. 570).

5 Courchene presumably used 1961 = 100.

6 The human capital approach suggests that it is preferable that the income variables not enter in ratio form as in equation II, because the expected net return to the migration investment will vary directly with the algebraic difference in (the present values of) destination and origin incomes, not with their ratio. For this reason, we have relied on equation I, rather than on equation II, as the basis for equation III. Equation I is also to be preferred to equation II because, when origin and destination income variables appear separately, as in equation I, the coefficient on the origin income variable can conveniently be assumed to capture the effects of income changes on the ability to finance a move, a consideration which plays no role in determining the size of the coefficient on the destination income variable.

7 On the choice of denominator on the left-hand side of equations I, II, and III, see the debate in Young (1975) and Vanderkamp (1976). We shall not join this debate, because a choice of denominator arises naturally in the context of the migration model to be introduced in the next chapter.

8 Recall from Chapter 1, note 12, that Alberta currently has the highest rates of both gross in-migration and gross out-migration.

9 We have also estimated equations I to III using FMP_{ij}/N_i, or total out-migration from a given province divided by total population in that province. *FMAC* is a measure of the number of *families* moving between provinces (as indicated by the transfer of family allowance accounts). As Courchene (1970, p. 560) notes, this excludes single people and married couples without children – the more mobile groups of the population. It is not possible to estimate migration flows of these latter two groups alone, though it is possible to estimate total flows, including children, and it is this variable that we use as a means of checking, in the first instance at least, the extent to which exclusion of singles and childless couples affects conclusions based on equations I to III. A detailed description of the methodology used to construct FMP_{ij} appears in Appendix B.

Since *FMP* (the interprovincial migration of *persons*) is estimated and *FMAC* is observed, it is clear that relative to its own universe, the former is not likely to be as reliable as the latter. Moreover, it may be the case that families with children will be better subjects for a study such as this one, which is generally concerned with narrowly defined economic determinants of migration. Single individuals may be more likely to move for reasons difficult to relate to differentials in a narrow sense, such as adventure. This, of course, is simply speculation on our part but, together with the assumptions required to estimate *FMP*, it suggests that *FMAC* is not obviously inferior to the alternative series *FMP*.

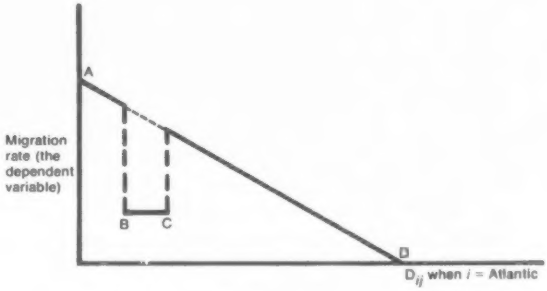
In any case, the results using *FMP* should not be expected to differ much from those based on *FMAC*. It is obvious from the plots of the two series (found in the Interprovincial Migration Data Supplement to this study) that they are highly, though not perfectly, correlated. For example, the simple correlation coefficient between the two series in the case of out-migration from Ontario is equal to .9902. Thus there is not likely to be much information in *FMP* not in *FMAC*, except with respect to orders of magnitude. We have found, in fact, that equations using *FMP* yield almost identical results to those which use *FMAC*, and this is why only results based on *FMAC* are reported in the text.

Moreover, a comparison of *FMAC* and *FMP* for Ontario indicates that families are more mobile than the average person in the Ontario population. This seems unusual in view of the expectation that unattached individuals are more mobile than families, since moving costs would likely be lower for the single individual, and suggests caution in using the *FMP* series.

See also Termote and Fréchette (1979) on the issue of *FMP* versus *FMAC* as a migration series.

10 Laber and Chase used actual median male earnings rather than actual average employment earnings. Needless to say, use of current median or average income over all individuals as a proxy for permanent employment income is subject to criticism. A substantially better proxy for permanent employment income will be introduced in the next chapter.

11 However, in the case of Canada, some of the costs of moving interprovincially may not be captured adequately by D_{ij} alone. The variables S_1 and S_2 proxy the psychic income associated with joining (S_1) or leaving (S_2) the French culture in Quebec. S_1 allows for the nonlinearity of the role of D_{ij} as a proxy for moving costs when i is an Atlantic province: ordinarily, we expect that an increase in D_{ij} (i.e., in the costs of moving) will reduce migration from province i to province j as given by curve *AD*:


A
Migration rate (the dependent variable)
B
C
D
D_{ij} when i = Atlantic

However, when i refers to an Atlantic province, the coefficient on D_{ij} will not accurately reflect the slope of *AD* because the section *BC*, representing the low rate of migration from Atlantic Canada to Quebec (except for the case of New Brunswick, which is also dealt with by suitable definition of S_1) is usually much below AD, and thus would tend to bias our estimate of the slope of AD, unless it were "dummied out" by including S_1 as an explanatory variable. S_2 is intended to capture the loss in psychic income to a French-speaking person moving out of Quebec to a different cultural environment. Since this cost is probably not directly related to the distance moved, it also has to be "dummied out" by including S_2 as an explanatory variable.

12 Of course, other ways of modelling income expectations have been suggested in the migration literature. Salvatore (1977) and Hart (1975), for example, recommend the usual adaptive expectations formulation in which expected employment income would depend on a distributed lag of current and past values of actual employment income. They then use a Koyck or some other transformation to eliminate lags, leaving only current income and lagged values of the dependent variable on the right-hand side of their estimating equations. The problem with this approach, however, is that estimation is then complicated, especially in the present pooled time-series cross-section context, requiring treatment of correlation between the lagged dependent variable and the error term and of serial correlation in the error term introduced by the Koyck (or other) transformation. Since we are going to introduce another, econometrically quite different model, which is also computationally expensive, in the next chapter, it does not seem worth while to try this particular alternative in the present study.

13 This is essentially the same variable used by Gramlich (1976), though in a different context.

14 See Grant and Vanderkamp (1976, Appendix D) for a comparison of the Unemployment Insurance Commission data base and the Labour Force Survey.

15 The legislated (as opposed to the effective) benefit/replacement ratio and the maximum weekly wage to which the benefit/replacement ratio applies have varied over time, but they are constant across provinces. CCH Canadian Limited (various years) provides a detailed history of the unemployment insurance legislation.

16 Our discussion of the modelling of income expectations has dealt only with the risk of job finding. It has been implicitly assumed therefore that all jobs in a given province carry the same wage, or that unemployment insurance benefits are the same for all recipients. That is, it has been assumed that the prospective migrant has a well-defined subjective probability of finding a job at any point in time, and this has so far constituted the only source of risk facing him.

This is an attractive approach econometrically, because it does not involve the variation in any employment or unemployment income stream as an independent explanatory variable. But this has the drawback that it implies all migrants are risk-neutral. If they are not, as is usually assumed (for example, in Grant and Vanderkamp, 1976, and Rothenberg, 1977), at least the origin and destination variances in employment and unemployment incomes (and possibly their covariance) should also be included as explanatory variables. We might, in addition, also include the variance of the underlying stochastic process generating the PE_{kt}'s (see Todaro, 1969, p. 142).

David (1974), for example, emphasizes the importance of the dispersion of wage offers in his job search model of migration. In this simultaneous model of job search and migration behaviour, the risk-averse individual would choose to migrate to the labour market having the lowest variance wage offer distribution on the one hand, but would also be repelled by such a market on the other, since it is not likely that the maximum wage offer will be forthcoming there.

The problem with the modelling of risk aversion, however, is that neither David nor the surveys that dwell on this issue, by Miron (1978) and Rothenberg (1977), suggest suitable proxies for the variance of wage offers in origin and destination. And the empirical importance of wage dispersion in migration equations remains, to our knowledge, an unsolved empirical question.

Except for expressing the hope that the variance of offers can be proxied by variables such as employment growth or the unemployment rate, which have already been added to the list of explanatory variables, and noting that the log form of the equations in Table 2-1 is consistent with risk aversion, this issue will be left on the agenda for future research.

17 Equations I, III, and V have also been estimated using other regional aggregations. These results are available from the authors on request. Recall that Courchene's original results were based on a pooling of data for all provinces. The family allowance data revision that we have conducted allows considerable disaggregation, since our 1951-78 series is much longer than Courchene's 1952-67 series.

18 We conducted a rough F-test (Maddala, 1977, pp. 322-23, and Chow, 1960) of the null hypothesis that all the corresponding coefficients in Table 2-3 are equal across provinces, using equation V in Table 2-3 and in Table 2-2. The test is rough because not all of the dummy variables S_1, S_2, and S_3 appear in each of the province-by-province equations in Table 2-3. The appropriate F (16, 1872) has a value of 140.4, which clearly indicates that the null hypothesis should be rejected.

19 Gauthier found that about 50 per cent of migration to Newfoundland between 1971 and 1976 was of the return kind.

20 In Courchene's equation III for out-migration from the Atlantic region, UI_j/YL_j has a negative and significant coefficient, as do Courchene's other fiscal variables.

21 See CCH Canadian Limited (various years) for the relevant legislation. Further consideration will be given to this Unemployment Insurance Act revision in the next chapter.

22 The presence of the shift variables defined using $T2$ does not affect the conclusions stated below. We have included them to see whether or not the influence of

fiscal variables other than unemployment insurance remains constant over time. However, the results of using this shift variable are ambiguous.

CHAPTER 3

1 η_k has the Weibull or extreme value distribution if prob $[\eta_k \leq \eta] = \exp[-e^{-(\eta + \alpha)}]$ where α is a parameter.

2 This model is also called the strict utility model, since the probabilities are proportional to their "strict utility" e^{V_j}, where the factor of proportionality is determined by the condition that exactly one alternative is chosen. McFadden (1973, pp. 111-12) has shown that a necessary and sufficient condition for the random utility model of equation (3.4) with the η_k independently and identically distributed to yield the strict utility model of equation (3.5), is that η_k be Weibull-distributed.

3 In the binary case ($J = 2$), the usual probit model results when the η_k are independently and normally distributed.

4 See Grant and Vanderkamp (1976, p. 36) for a simple numerical example. This property, of course, implies that any increase in one migration flow, say, from region *i* to region *j* considering all flows from origin *i*, will proportionately decrease flows from region *i* to all other destinations (including the staying choice). Recent development of the generalized extreme value model (see McFadden, 1980, for an introduction) permits relaxation of this assumption via the use of η_k's that are not independently distributed. We do not employ that model here.

5 In the Tiebout class of models, individuals will move from jurisdiction *i* to jurisdiction *j* until, for the marginal migrant, total utility from private and public activity is equal across jurisdictions (see, for example, Epple and Zelenitz, 1981, or Flatters, Henderson, and Miezskowski, 1974). That is, migration will occur until the sum of total expected net private benefits (net of moving costs) plus total expected net public benefits is equal in jurisdictions *i* and *j*, where net public benefits (also called net fiscal benefits, or the fiscal surplus) are defined as what the migrant is willing to pay for public services received in a given jurisdiction, less what he actually pays in taxes. The marginal migrant bases his decision on total benefits rather than on marginal benefits, since a migration decision is not divisible. On this equilibrium condition, see also Buchanan and Goetz (1972), Stiglitz (1977), and Usher (1977).

6 On the concept of Lindahl equilibrium, see, for example, Boadway (1979, Chapter 4) or Head (1974, Chapters 3 and 6). The characterization of a Tiebout equilibrium as a Lindahl equilibrium is discussed by Holcombe (1980).

7 For a discussion of this issue, see, for example, Oates (1969); Edel and Sclar (1974); Wales and Wiens (1974); Hamilton (1975, 1976, 1979); Pauly (1976); Meadows (1976); Rosen and Fullerton (1977); Cebula (1979a, Chapters 9 and 10); Epple, Zelenitz, and Visscher (1978); Epple (1980); Epple and Zelenitz (1981); and Starrett (1981).

There seems to be very little consensus in this literature about what the capitalization of taxes (or, more generally, net fiscal benefits) into property values indicates concerning the efficiency of the local public sector. Oates argues that the existence of such a relationship would imply that voting with the feet had successfully resulted in efficient local public goods provision. Edel and Sclar (1974) argue the opposite, that, in a Tiebout equilibrium, tax rates should be uncorrelated with housing prices. Epple, Zelenitz, and Visscher (1978) conclude that which of the above views is correct depends on the precise characteristics of the model being used, and Epple (1980) adds that the existence of tax capitalization is simply a result of rational economic behaviour, and that nothing can be inferred from its presence concerning the efficiency of the local public sector.

Fortunately the issue need not be resolved here, since we are primarily interested in estimating the extent of the relationship between migration and fiscal structure, and not with the normative implications of this relationship, if it exists. Our interest in the tax capitalization literature stems from a desire to construct estimating equations that are robust with respect to the empirical models that have emerged in the course of the above debate.

8 Richardson (1979, p. 110) seems to refer to something like this (which he calls "burden" effects) as an aspect of behaviour in a Tiebout model. See also Wheaton (1975).

9 The treatment of *s* is also related to the construction of Y_k, as will be shown below.

10 A similar assumption has been used by Winer (1981).

11 We shall not be able to identify the degree-of-publicness parameter, but this presents no problem in the present context.

12 To some extent, we shall also disaggregate migration flows by age, source of income, and some other characteristics, as described below.

13 We could add provincial/local bonds in origin and destination to the right-hand side of equation (3.14) via equation (3.9), and correspondingly add another equation (for bonds) to (3.15) and a term in bonds to the right-hand side of equation (3.16). But, since we are going to substitute the right-hand side of equation (3.15) into equation (3.14) anyway, the bond variables would drop out of the resulting reduced form. For further elaboration on the specification of the budget restraint in equation (3.16), including the fungibility of *GC*, see Winer (1981).

14 Other provinces also have natural resource revenues such as that from hydro-electric generation, but they have not increased as dramatically as that from oil and gas in our sample period 1968-77.

15 On the capitalization issue, see the references cited earlier in note 7.

16 Such capitalization would never completely eliminate the incentive to migrate between regions. Capitalization will only occur to the extent that the supply of housing services is inelastic. But migration is only possible if the supply of housing services is not completely inelastic. (The definition of a unit of housing services implied here includes the size of houses, the height of buildings, the number of families per residential unit, and so forth.) We should also note that it need not be only regional differences in public sector variables that give rise to capitalization. Migration in response to employment income differentials may also result in the bidding up of housing prices according to the capitalized difference of these differentials. Moreover, in principle, there is no reason to expect that capitalization of net fiscal benefits will be reflected only in the price of houses. Such capitalization may be reflected in the price of other commodities as well.

17 See Appendix A for the source of this index. In his criticism of previous research on the migration impact of public policies, Cebula (1979*a*, pp. 128-29) argues that cost-of-living differentials have been unjustly neglected.

18 Parenthetically, Renas found that using a separate term for price differences worked better in his interstate (United States) migration equations than deflation did.

19 By a mobility matrix for a given year, we mean a matrix whose rows are defined by all possible provinces of origin, whose columns are defined by all possible provinces of destination, and whose elements are the out-migration flows for each corresponding origin/destination pair.

20 Denoted *YD* in Grant and Vanderkamp (1976, p. 43).

21 *YA* and *YS* include income from self-employment.

22 Grant and Vanderkamp used an average over all individuals (movers plus stayers) in province *i* instead of YS_i. In fact, these two averages are very similar, since out-migration rates for a given origin (to all possible destinations) are typically less than 5 per cent in any year.

We use YS_i because, in principle, the average income of movers is not likely to be as well reflected in information available to a potential migrant in the origin as the average incomes of those who are not as mobile.

23 Grant and Vanderkamp (1976, p. 43).

CHAPTER 4

1 See also Cox (1970) and Pindyck and Rubinfeld (1976, Chapter 8).

2 See Theil (1970, Appendix G).

3 There is the possibility that the error term in equation (4.1) may be correlated across provinces of destination *j* and origin *i* because of common explanatory variables that have been omitted from the right-hand side of equation (4.1), such as those relating to national economic or political events. Thus it would seem that a seemingly unrelated regression (SURE) technique (see Zellner, 1962; and Zellner and Lee, 1965) applied to equation (4.1) as a set of $J \times (J-1)$ equations is required for efficient estimation. But, quite apart from the practical difficulties that make this technique too costly in the present case, Rao (1974) has shown that SURE estimation is not more efficient than least squares (after treatment for the nonspherical variance-covariance matrix (4.2)) when the correlation of the error terms across equations stems from common, omitted variables.

4 Theil (1970, p. 109).

5 All these variables are elements in the consolidated budget restraint of the federal government and the central bank, but note that there is no exact identity relating these variables because the federal budget restraint need only hold over all provinces taken together, and because net new debt, the change in the monetary base, and the change in foreign exchange reserves are major elements in this budget restraint, which do not appear in equation (4.5), as it is assumed they do not significantly influence migration behaviour directly.

6 It is useful to recall here the discussion in Chapter 3 of Courchene's attempt to capture the transfer-income/migration relationship by using the origin variable UI_i/YL_i.

7 Saskatchewan is not grouped with Alberta and British Columbia because it is a recipient of equalization payments in our sample period while the latter two provinces are not.

8 Recall that NRR_k is defined to be zero except when *k* refers to Saskatchewan, Alberta, or British Columbia. Hence we can regard the coefficient on *NRR* in samples which include intra-Atlantic moves as being solely related to out-migration from the Atlantic region to the west.

9 In Tables 4-5 to 4-7, equation IX exhibits coefficients on $\Delta E_j/L_j$, which are positive and significant, and coefficients on $\Delta E_i/L_i$, which are negative and (with one exception) significant, as expected. But the coefficient on $U_j/\bar{U}$ is always positive and significant. This could result from simultaneity of unemployment and in-migration, as is suggested by Greenwood (1975), in spite of our argument to the contrary.

10 The positive, significant sign on $UIDEX_i$ for the *MR* group in equation VIII may be due to the absence in that equation of the employment growth and unemployment rate variables. Since these proxies for aggregate activity are absent, the coefficient on *UIDEX* might pick up the importance of changes in aggregate activity on migration to a greater extent than in equation VII. (Recall that *UIDEX* depends on MAX_k/MIN_k, and that MAX_k increases when unemployment in province *k* increases relative to the national average unemployment rate.)

11 The dummy S_2, which has a value of one when migration originates in Quebec, does not appear in Table 4-12 because here we consider Quebec alone. But it is appropriate to note at this point that, whenever S_2 does appear in an equation, it is always

negative and highly significant, except for poor income groups moving to Ontario (Table 4-10). Clearly there is a preference for residence in Quebec not captured by the (narrowly defined) economic determinants of migration behaviour included in the estimating equations. Such a preference could be partly responsible for the weak performance of fiscal variables in explaining migration to and from Quebec.

12 Note that, in this case, coefficients are generally larger for lower-income groups.

13 It is of interest to note that the coefficient on *D(NRR/N)* in Table 4-16 is negative. This probably reflects the fact that when *NRR* and in-migration to the west increased after 1970, so did the rate of out-migration from the west to the rest of Canada.

14 The important exception is the influence of transfers (other than unemployment insurance) to individuals, which in our results appear to significantly influence decisions of both *M* and *R* income groups.

15 An important exception here is the positive influence of unconditional grants on migration from Ontario to the rest of Canada (including the Atlantic provinces).

16 Recall that the destination of most out-migrants from the Atlantic region is Ontario, whereas the origin of most migrants from the rest of Canada to Alberta and British Columbia is Ontario.

CHAPTER 5

1 For example, our estimation of equations for the odds of moving from the rest of Canada to Alberta and British Columbia involves just two destinations. However, to compute on the basis of those equations the probability of moving from Newfoundland, say, to Alberta, rather than just the odds of moving between these provinces, requires that estimates of the odds of moving to nine provinces as opposed to staying in Newfoundland. We have assumed therefore that the odds of moving to, say, Ontario from Newfoundland can be approximated using the coefficients of the equations for the odds of moving from the rest of Canada to Alberta and British Columbia.

2 Since the coefficients on the origin and destination unemployment insurance generosity indexes in equation VIII from Table 4-2 are about equal in size, this result depends on the relative increase in the unemployment insurance generosity index (*UIDEX*) in the Atlantic region between 1971 and 1977 compared with the movement in this index in Ontario.

3 The exception is the small reduction in the rate of out-migration from Newfoundland to Ontario (2.7 per cent) in Table 5-2.

4 Recall that, by definition, variations in expected employment income Y_k reflect both variations in job opportunities and in wage rates.

5 Of course, it still remains the case in Tables 5-1 to 5-6 that, taken separately, the various components of fiscal structure generally have a greater quantitative impact on the poor than on the rich for any given province of origin.

CHAPTER 6

1 In this respect, the work of Foot and Milne (1981) is promising because it uses an interregional migration framework that leads to well-defined statistical tests concerning regional variation in the determinants of migration.

2 We say "on balance" here, because we have found that the unemployment insurance system significantly stimulates out-migration, perhaps by increasing the present value of job search in high-wage, high-unemployment regions such as British Columbia. Recall that, in Chapter 5, the retarding effect of unemployment insurance was found to dominate in the case of out-migration from the Atlantic region, while the enhancing effect of unemployment insurance was found to be dominant in explaining migration from central Canada to Alberta and (especially) British Columbia. The simulation also indicated that unemployment insurance stimulated interprovincial migration within the Atlantic region.

3 Some work in this direction has already been done. See, in particular, Boadway and Flatters (1981*a*), and Jenkins and Kuo (1978).

APPENDIX B

1 Excerpted from Statistics Canada, cat. no. 91-208, annual.

2 Some calendar-year data for years prior to 1979 are available in *CANSIM*, but these data simply give total in, total out, and net migration for each province, rather than the complete set of gross flows referred to here. Since 1979, Statistics Canada has published a complete set of gross flows on a calendar-year basis, which can be used to update the data given in the supplement to this study.

3 The method was developed in Kasahara (1963), and was later modified by Statistics Canada in order to take account of the fact that the average number of children per family between migrant and nonmigrant families could be different.

4 Data on $FMAC_{i,j}$ and X_i were obtained from Health and Welfare Canada, c_i and F_i were taken from Statistics Canada, cat. no. 91-208, and P_i^e and P_i^a were provided by the Demography Division of Statistics Canada.

APPENDIX C

1 We would also like to thank Manohar Surkund of the Economic Council who did much of the computer work. We nevertheless assume full responsibility for possible errors in the construction and use of the data.

2 In order to identify interprovincial migrants and stayers, only those individual tax returns that were in our sample for at least two consecutive years could be used. We therefore also excluded any file that did not meet that condition.

List of Tables and Figures

Tables

1-1 Quinquennial Net Interprovincial Migration, 1951-80 10

1-2 Provincial Indirect Natural Resource Revenues Per Capita, by Province, 1968-77 10

1-3 Federal Transfer Payments to Individuals, Including Unemployment Insurance, Per Capita, and as a Proportion of Labour Income, by Province, Selected Years 1952-77 11

1-4 Unconditional Transfers from the Federal to Provincial Governments Per Capita, by Province, Selected Years 1952-77 11

2-1 Summary of Chapter 2 Estimating Equations 14

2-2 Estimating Equations for Out-migration from All Provinces Except Prince Edward Island, 1951-78 17

2-3 Estimating Equation V for Out-migration from and to each Province Except Prince Edward Island, 1951-78 20

2-4 Estimating Equations for Out-migration from the Atlantic Region, 1951-78 22

4-1 Summary of Chapter 4 Estimating Equations 43

4-2 Estimating Equations for Out-migration from the Atlantic Provinces Excluding Intra-Atlantic Moves, *PNTP* and *MR* Income Classes, 1968-77 44

4-3 Estimating Equations for Out-migration from the Atlantic Provinces Including Intra-Atlantic Moves, *PNTP* and *MR* Income Classes, 1968-77 44

4-4 Estimating Equations for Out-migration from the Atlantic Provinces Including Intra-Atlantic Moves, Four Income Classes, 1968-77 45

4-5 Estimating Equations for Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77 48

4-6 Estimating Equations for Migration to Alberta and British Columbia Including Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77 48

4-7 Estimating Equations for Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, Four Income Classes, 1968-77 49

4-8 Estimating Equations with First-order Autoregressive Structure, Out-migration from the Atlantic Provinces Including Intra-Atlantic Moves, and Migration from the Rest of Canada to Alberta and British Columbia Excluding Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77 51
4-9 Estimating Equations for Out-migration from Ontario, All Income Classes, 1968-77 52
4-10 Estimating Equations for Migration from the Rest of Canada to Ontario, All Income Classes, 1968-77 53
4-11 Estimating Equations for Out-migration from Manitoba and Saskatchewan, and Migration to Manitoba and Saskatchewan Including Intra-regional Moves, *PNTP* and *MR* Income Classes, 1968-77 54
4-12 Estimating Equations for Out-migration from Quebec and Migration from the Rest of Canada to Quebec, *PNTP* and *MR* Income Classes, 1968-77 54
4-13 Summary of Results Concerning the Influence of Fiscal Structure on Out-migration from the Atlantic Provinces and In-migration to Alberta and British Columbia, 1968-77 55
4-14 Summary of Results Concerning the Influence of Fiscal Structure on Interprovincial Migration, Canada, 1968-77 56
4-15 Estimating Equations for Migration to the Atlantic Provinces Including Intra-Atlantic Moves, All Income Classes, 1968-77 58
4-16 Estimating Equations for Out-migration from Alberta and British Columbia Excluding Intra-regional Moves, All Income Classes, 1968-77 59
5-1 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Excluding Intra-Atlantic Moves, *PNTP* Income Class, 1968-77 64
5-2 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Including Intra-Atlantic Moves, *PNTP* Income Class, 1968-77 65
5-3 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Excluding Intra-Atlantic Moves, *MR* Income Class, 1968-77 65
5-4 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates from the Atlantic Provinces Including Intra-Atlantic Moves, *MR* Income Class, 1968-77 66
5-5 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates to Alberta and British Columbia, *PNTP* Income Class, 1968-77 67
5-6 The Effects of Selected Changes in Fiscal Structure on Out-migration Rates to Alberta and British Columbia, *MR* Income Class, 1968-77 68

Figures

1-1 Gross Inflow and Outflow Rates of Family Allowance Accounts, New Brunswick, 1950-78 7
1-2 Gross Inflow and Outflow Rates of Family Allowance Accounts, Ontario, 1950-78 8
1-3 Gross Inflow and Outflow Rates of Family Allowance Accounts, Alberta, 1950-78 9

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